Sept./Oct. 1985 The Grape-growing & Winemaking Review $3.75

PRACTICAL WINERY

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SCOTT TALKS #1: First in a series of informal discussions.

A day in the life of an unusual detective.

Kent Sakato,
Lab Director

"Every day is different, and every job is a mystery to be solved…sometimes in an hour, sometimes it takes weeks. The most challenging involve wines with something wrong—taste or smell, or an unexplained cloudiness. It's fascinating, just fascinating."

Kent is a thorough, professional wine detective with B.S. and M.S. degrees in food technology and enology from U.C. Davis. He was associated with two wineries before joining Scott Labs over eight years ago.

"Some months we run over 3500 tests on wine alone. We not only solve mysteries, we verify findings from our customers' labs, we are constantly testing our own products such as corks and filter sheets, doing water tests and certifying winery inventories. It's a mixed bag. One of the things we are doing today is analyses of leachable metals in filtersheets."

The number of challenges met in the course of a year at Scott Labs is staggering…but it has given Kent and his staff a wide exposure to an almost unbelievable variety of problems. This kind of experience is immensely valuable to customers who face a particularly knotty mystery.

The wine industry is fortunate Kent decided to become a research enologist. Like others in our 50 year history, he serves with enthusiasm, dedication and discretion…all virtues of a first rate detective.

Dear Scott Labs:

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- ☐ I suspect we could make use of a visit by one of your "detectives" or other such expert. I'd like to discuss it first by phone.
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Letters

Dear Editor:

I enjoyed reading the story on Chambourcin in the July/August 1985 **PW**. I'm really glad that you are dealing with some of the 'other' grape varieties grown in the USA, even the 'lowly' French Hybrids. Keep up the good work!

Whenever you get around to doing a piece on Marechal Foch, be sure to include my humble efforts. My research leads me to believe my winery is the only producer of this variety in the western United States. My 1982 won 'Best of Class' at the 1984 Eastern Wine Competition in New York and a market for it is developing rapidly for it here in Oregon.

My third vintage, the 1984, is ready for release and is the best so far—despite the dismal 1984 growing season here in Oregon for practically everything else. I picked the Foch the last weekend of September, BEFORE the rains started in early October, at a very good 22.5° Brix.

My experience leads me to believe it is a perfect variety for the Willamette Valley, perhaps even more so than Pinot noir, since it is so dependable every year. You'll be seeing more and more of it on the market as my production increases and other wineries find out that it really is a wine people like.

Drop by for a visit next time you're in Oregon! Let me know in advance if you're going to bring Jake Lorenzo along, so I can stock up on tequila!

Sincerely,
Glen A. Longshore,
Winemaker and co-owner
Serendipity Cellars Winery, Monmouth, OR

Dear Editor:

We've just completed our first harvest, and are busy with our first batch of wine. We're encouraged by the quality of our grapes imported from vineyards such as Mondavi's through Ge-No's Nursery in Madera, CA. Of course, the thousands of birds we have here (which are gorgeous to look at, but extremely damaging to the fruit) took about 20% of our crop, so we're trying everything we can think of, and afford, to get rid of them.

When we were in California last year, many people we met during our tour of the wine country expressed interest in visiting Kenya to see how things operate here. Our invitation to them all is always open, and we hope that one day we'll have lots of California winemakers knocking on our door!

Sincerely,
John and Elli D'Olier
Lake Naivasha Vineyards, Naivasha, Kenya

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The Grape-growing & Winemaking Review

PRACTICAL WINERY

SEPTEMBER/OCTOBER 1985 VOLUME VI, NO. 3

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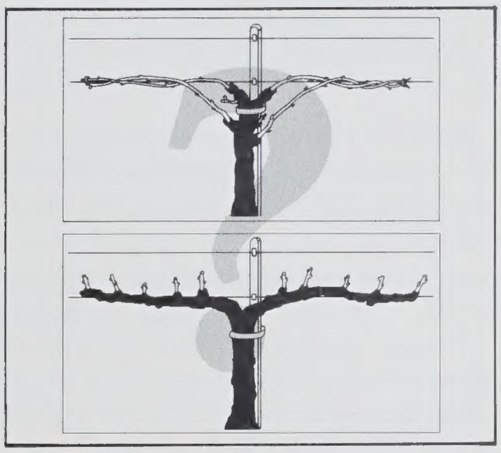
> *Good wine is a good familiar creature, if it be well used.*
>
> (Othello) William Shakespeare (1564–1616)



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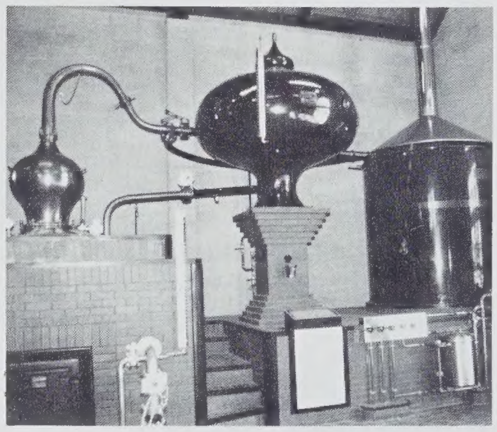

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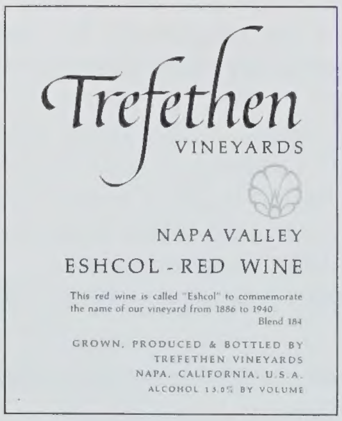
Introducing a New Department...



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See page 47.

Cover

Mechanical harvesting of grapes for Domaine Chandon in Napa Valley, CA Photographed by Fred Lyon.

Free Run

Diane Mayfield

Several new books and directories of interest to readers in the wine and grape-growing industries have recently become available. Following are highlights from three of the new arrivals.

Evaluation of Grape Supply Fundamentals
George M. Schofield

"Grape Intelligence" (1) is a recently completed comprehensive report which analyzes the grape situation in California from both historical (1976-84) and projected (1985-90) viewpoints. Six major points emerge from "Grape Intelligence" as having a major impact on California grape fundamentals through the end of the current decade. The commentary is accompanied by 5 pages of summary statistics for the state on an aggregated red and white variety basis.

1. *Raisin Grape Surplus* A fundamental structural surplus of raisin variety grapes exists in California that underlies the overall imbalance of grape supply and demand. Planting of approximately 50,000 acres of Thompson Seedless between 1978-82 in the face of declining demand is the primary cause of this large and growing excess of raisin grapes. This large surplus of Thompson Seedless has caused a ripple effect for many wine variety growers as well. The distressed price of raisin grapes has exerted a strong negative influence on the market for wine grapes normally earmarked for generic wine production (particularly French Colombard and Chenin blanc).

2. *French Colombard/Chenin blanc & Displacement of Raisin Grapes* Ten years ago, raisin varieties were far and away the most prominent grapes crushed by wineries. By 1980, however, French Colombard and Chenin blanc combined accounted for 16% of the total crush. By 1984 this ratio was 28%, as the 60,000+ acres planted during the period 1978-82 began to mature. As late as 1982, in the face of a recession and a flat wine market, 7,568 raisin grape acres were planted while French Colombard and Chenin blanc acreage expanded by over 16,000 acres. Clearly, both French Colombard/Chenin blanc and raisin grape growers overestimated the growth of the market for their grapes.

3. *Switch from Red to White* The relatively small increase in total wine varieties crushed over the past five years masks a dramatic trend in the shift of production from red to white grapes.

	%Red	%White
1977 mix of red to white	66%	34%
1984 mix of red to white	43%	57%

This dynamic restructuring represents a tremendous amount of T-budding, grafting, removals and replanting since 1977. Moreover, we appear to be in mid-stream of this process as projections out to 1990 indicate a further decrease of 6% of red wine varieties and an increase of 39% of white wine varieties.

4. *Grape Yields Below Expectations* Actual yields calculated on the basis of equivalently mature acres indicates that harvested yields per acre have been significantly below general expectations for the period 1976-84.

Leon Garoyan, in 1975, published a report (2) on the California grape industry which contained an appendix detailing estimates of yields per acre for different grape varieties for 5 regions of California. The yields are predicted according to age of the vine, ranging in categories from 3-6 years and over. The overwhelming conclusion is that vineyards on the average have been harvesting 25% less per acre than most knowledgeable individuals (both bankers and viticulturists) expected.

It should be mentioned, however, that due to technological improvements in viticultural practices and increases in the yielding capacity of new clones, actual yield per acre numbers over the last nine years have been trending upward at a steady rate.

5. *Wine Inventories* Wine inventories which are significantly impacted by the size of the most recent crop, have been on the decline since 1983, following the record 1982 grape crop.

Thus, despite talk about surplus wine inventories since 1982, it appears as though inventory levels have been gradually declining. Barring another bumper crop, the projection is for this trend to continue over the next few years. However, due to the depressing effect of a huge reserve capacity of raisin and white generic wine grapes, substantial grape price relief will probably not occur for several years.

6. *Slight Growth in Overall Grape Acreage and Production Base* Implication of this projection, which portrays slightly less than a 1% increase in overall grape supply, is that in the face of any significant surge in demand, the supply and demand balance for grapes should realign and potentially even swing back toward a shortage situation for many varieties. An above-normal increase in demand and/or a year or two of below-normal yields could quickly move the grape industry from surplus to shortage in a relatively short period of time.

References:

(1) Schofield, George M. and Robert Murray, 'Grape Intelligence', 1985

- **Wine Analysis and Microbiology**
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(2) Garoyan, Leon, 'California Grape Industry, Some Economic Considerations', University of California, 1975

Available from George M. Schofield Co., PO Box 539, St. Helena, CA 94574 are:

The Executive Grape Supply Overview, 36 pp of analysis, tables, and colored graphs - $250.

Grape Variety Summary and Analysis, 14 pp report on each of 11 wine grape varieties; each - $40; complete set - $350

Regional Statistical Report, for each of 9 regions including red and white varieties, each - $20; complete set - $150; a separate report summarizing the state of California is available.

Grape Variety Statistical Report, for each of 23 wine grape varieties, each - $60; complete set - $1,000

Modern Winemaking
Philip Jackisch

Modern Winemaking is a useful text for the student of enology, the amateur winemaker, and the small winemaker without extensive formal background in enology and viticulture. All the basics are covered in straightforward language.

Chapter 3, a succinct essay on the composition of wine, provides a good example of Jackisch's straightforward writing style. Basic chemistry is clearly explained and, as the author says, "Readers need no knowledge of chemistry to use the information in this chapter."

Blending tactics discussed in Chapter 9 are timely and deserve the consideration of even the most well-trained winemakers in the industry.

Appendix B covers laboratory evaluation of wines and provides a checklist of basic laboratory analysis that every winery producing commercial wines of quality should use. The reason for certain tests is explained very well.

Modern Winemaking is available from Cornell University Press, 124 Roberts Place, Ithaca, NY 14850 and Wine Appreciation Guild, 155 Connecticut St., San Francisco, CA 94107 for $25.00.

European Wine World
Edizioni Annuari D'Italia

European Wine World, this year in its 4th edition, supplies wine importers and exporters with a point of reference for the management and development of their contacts worldwide.

E.W.W. is a useful catalogue of essential information, divided into 'exporters' and 'importers' sections, providing up-to-date information—including telex numbers—for importers, dealers and exporters of wine in each of the 70 countries covered. For the sake of completeness, all the information included is published free of charge. Exporters are grouped according to region.

E.W.W. is thoroughly updated each year, relying on the cooperation of readers to reply to the questionnaires sent them, thus supplying the editors with all current information. *E.W.W.* is available for $25US including postage by surface mail (add $10US for air mail) from Edizioni Annuari D'Italia, Piazza Roosevelt, 4, 40121, Bologna, Italy.

Interstate Consumer-Direct Wine Sales in Oregon

Direct interstate wine sales and shipment by common carrier to consumers of small quantities of wine would be allowed on a state-by-state basis under model legislation being prepared for implementation on a reciprocal basis by a newly created task force of the Oregon legislature.

The task force is currently being organized in Oregon and is seeking cooperation and funds from winery and vineyard associations in all states. The basis of its work will be to obtain passage of reciprocal state legislation which will allow the interstate shipment of wine to individuals via common carrier.

The Oregon task force is part of the state's Economic Development Department and has been operational since August 15, 1985. Funding will be primarily through gifts and grants from winery and vineyard trade associations. The Oregon Wine Advisory Board has already pledged $5,000 towards the project's budget.

The task force will have seven members including two from the Oregon wine industry, two Oregon legislators, a wine wholesaler, a mailorder representative, and one from the state liquor commission.

For more information, contact Bill Nelson, 1359 West Fifth, Eugene, OR 97402, or telephone (503) 343-4078.

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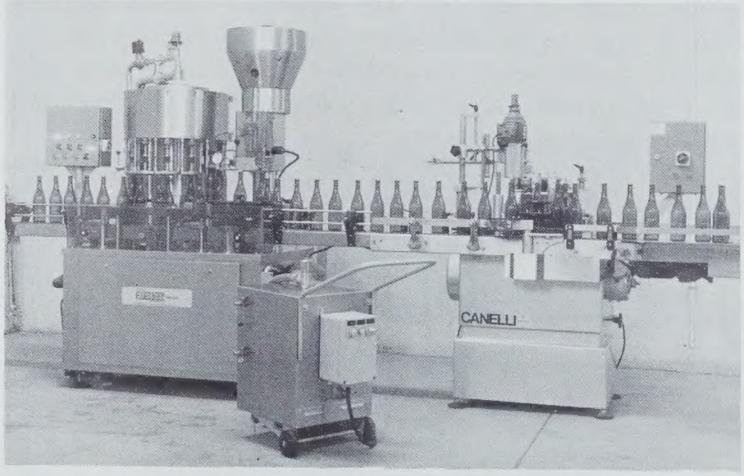

Bottling Line Installed at Whitehall Lane, St. Helena, CA

In The Cellar

Jake Lorenzo

Editor's note: After a great day of eating and drinking at Jake's house, we injudiciously held a tequila tasting. Against everyone else's judgment, I pronounced myself able to drive and belligerently refused to surrender my keys. My car wouldn't start and Jake graciously allowed me to spend the night. The next morning he handed me the coil wire to my car.

I'll tell you the truth. I read the paper almost every day, but I only read the sports section and sometimes the movie section.

I mention this because while reading the paper I had a revelation, one of those flashes of insight that clearly and concisely focuses all the disparate elements in your life into a simple truth.

Of course, such revelations are fleeting and virtually impossible to pass on, as you are about to see.

Actually, I was minding the counter at Chuy's Burrito Palace. Chuy was attending a meeting of local restaurateurs and bar owners who bemoaned the current tragic state of their business. They put the blame squarely at the feet of the neo-prohibitionists, the cops busting people for drunk driving, and video merchants.

I had finished the Sporting Green and was into the movie section when I saw the listing of the top ten TV shows.

Revelation struck.

I don't watch any of the top ten TV shows. Not in America. Not even in San Francisco. And that's not all: I don't like white zin, I don't drink wine coolers, and none of the politicians I vote for ever get elected. I'm out of the mainstream of American life.

That got me thinking about freedom. By freedom, I'm talking about freedom of choice. Freedom of choice is a most precious commodity. Accordingly I treat it with great respect and I am distressed when I see it squandered.

Freedom of choice has two great enemies and one catch.

The first enemy is poverty. You don't have a choice if your baby is starving, or you can't get necessary medical care or if you have no place to sleep. The second enemy is ignorance. You can't choose what you don't know. People who have never seen a steak rarely order one, and people don't visit places they've never heard of.

We are fortunate in America. For the most part we have defeated the enemies of freedom. Most of us are not hungry and most of us have the opportunity to acquire knowledge.

In America we suffer from the catch: When you make a choice, you have to take responsibility for the consequences.

The catch scares the hell out of a lot of people. Making a choice and being responsible for the consequences is too terrifying. Instead they look for other people to tell them what to do, what to eat, what to wear and what to think. They squander their freedom.

The backside of this phenomenon is equally frightening. When there are hordes of people looking to be told what to do, others take it upon themselves to direct them. They quickly assume that they have a right to enforce their opinions on the rest of us.

Frankly, this pisses me off. As I've said, I take my freedom of choice pretty seriously and I sure as hell am not going to give it up without a fight.

Now I've already admitted to being out of the mainstream of American society, but see if this makes sense.

In my profession I'm a private eye, but in the rest of my life I'm a social animal. I like to be with other people, I like to share food with other people and I like to drink. I seriously enjoy a fine meal and a couple of bottles of wine. Often I am slightly over the legal limit and shouldn't drive home, but I have no convenient alternatives. We have few cabs, none late at night. We have no buses after dark. My house is too far to walk, and usually the people with me have also been imbibing.

Judging from the meeting Chuy's attending, many people are opting to stay home and watch a video. That's fine, but it's tough on my friends in the restaurant and bar business and it's tough on the wine business.

I'm not advocating that we allow drunks to continue their slaughter on the country's highways, but I resent having my freedom of choice infringed upon. I resent having my lifestyle attacked. The anti-drunk driving supporters have missed the point. We need to get drunk drivers out of their cars and off the streets. It's not a crime to drink. It's not a crime to get drunk. Getting behind the wheel of a car while intoxicated shows poor judgment (and may lead to disastrous results), but it is not a criminal act.

Right now we must be wary. The police may not be able to catch criminals, but they can catch you. They are on the streets and highways of our state and they can't wait to nail you. This leads to lots of embarrassment, inconvenience and expense. It jams our overflowing court system and it crowds our overcrowded jails. But as statistics prove, the one thing it does *not* do is get the drunk driver off the streets.

I have a better idea. Stop treating people who enjoy drinking like criminals. Provide them with an agreeable and convenient alternative to driving home. Develop a program that will educate and enlighten instead of threaten and punish.

Here's how: We must provide alternatives to driving home while intoxicated. Since I am a great believer in experiential education, I would prefer that guilty drunk drivers be forced to do community service. They would report to police stations with their own vehicles. As people in restaurants, bars and at parties found themselves too inebriated to drive, they would call their local police station. One of the community service drivers (CSD) would be dispatched to take the people where they had to go.

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Police stopping inebriated drivers would need only write a ticket. If no one in the car is capable of driving, the officer could summon a CSD. CSDs would work in shifts well into the morning and could take people back to their cars if necessary.

The beauty of this plan is that it not only keeps the drunks off the roads, but it allows the CSDs to confront drunken, obnoxious, puking behavior and gives them the opportunity to learn from the experience. Since there would be no need to drive when intoxicated, those who continued to do so could more easily be targeted as problem drinkers and guided to the proper agencies with their problems.

Objections to the plan are many, but most are nonsense. Insurance problems and administrative costs could be covered by fines from the CSDs and from contributions from the liquor and service industries. The program would allow for tremendous savings in court costs, jailing expense, lost man hours and paper work. It would free cops to chase real criminals *and* it would keep drunk drivers off the road.

Unfortunately, there is one valid objection. Cab drivers are not into experiential education as much as I. Therefore, in those areas where there is adequate cab service, fines would be higher, CSDs would not operate and cabs would be summoned to drive people from one place to another. They would be paid from the collected fines.

I am for freedom of choice. I choose to be humane and effective. Chuy says he'll drive me home, so if you don't mind I think I'll have one more shot of Hornitos. Enjoy, and don't drive drunk.

Australian Society of Viticulture & Oenology

PROCEEDINGS

The Australian Society of Viticulture and Oenology, Inc, with over 400 members, has proceedings available from several recent one-day seminars. Description and cost are below:

Grape Quality

Assessment from Vineyard to Juice Preparation — 77 pages. Topics: pH & Acidity Regulation in the Vineyard by Water Supply; Manipulation of Wine Quality Within the Vineyard; Grape Quality Assessment; Juice Preparation Procedures. Cost: A$15

Fermentation Technology

94 pages. Topics: Basic Yeast Technology; Yeast Propagation; Effect of Solids on Fermentation Rate; Yeast Growth & Nutrition; Botrytis cinera in Winemaking; Roto-tanks for Red Wine Fermentation; Carbonic Maceration; Small-scale Winemaking in Varietal Assessment; H_2S Formation. Cost: A$15

Coonawarra Viticulture

63 pages. Topics: Mechanized Viticulture in an Australian cool climate area including mechanical pruning, canopy management, minimal pruning, use of herbicides and ethephon. Cost: A$15

Malolactic Fermentation

143 pages. Topics: Taxonomy; Ecology; Physiology; Metabolism; Isolation and Identification of Lactic Acid Bacteria; Management of MLF; Development of Commercial Cultures; Simultaneous Inoculation; Culture Preparation; Commercial Experience. Cost: A$20

A complete set of the four proceedings is available for A$60. This amount covers handling and postage by sea mail. For surface airlifted postage add A$5 to the cost of each proceedings and A$8 to that of the set. Orders should be sent to The Secretary, Australian Society of Viticulture and Oenology Inc., c/o The Australian Wine Research Institute, Private Mail Bag, Glen Osmond, SA 5064, Australia.

A complete proceedings (450 pages) of the Fifth Australian Wine Industry Technical Conference held in Perth, November 1983 is available from University Extension, University of Western Australia Nedlands, WA 6009, Australia. Cost of the proceedings is A$40 by sea mail; please make drafts payable to University of Western Australia - Extension.

The Sixth Australian Wine Industry Technical Conference is being organized by the Society in conjunction with the Australian Wine Research Institute to be held in Adelaide, July 14-17, 1986. Contact the Institute for further details.

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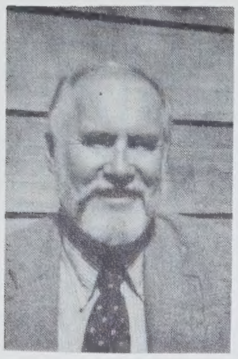


Winery Water & Waste

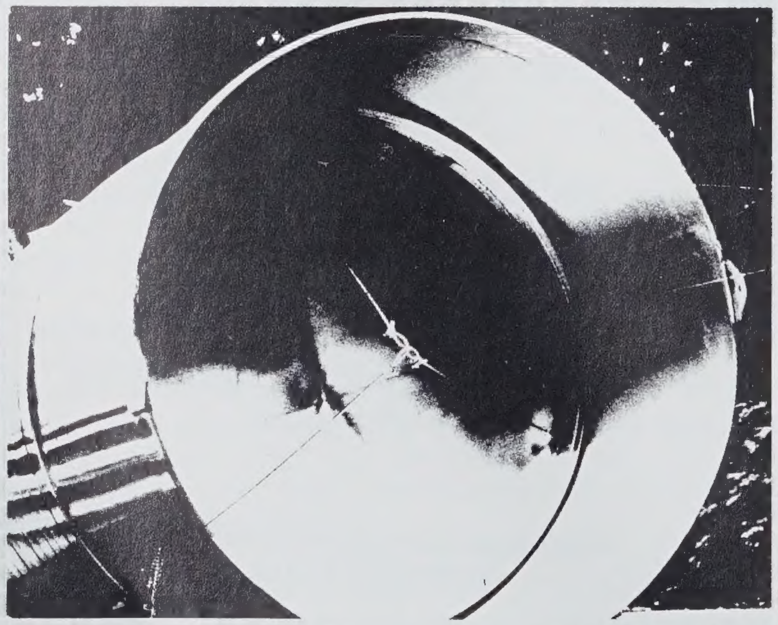
D.R. Storm, Ph.D., P.E.

WINERY WASTEWATER SYSTEMS:
Changing Technologies & Technology Assessments

Wines with Staying Power

'Rare wine' auctions are so common an occurrence in recent years that I wonder where all the stock comes from in what has to be an ever-dwindling supply. Maybe it's just hoarded and used for cellar fondling, but not drunk, by ultra-serious collectors—these folks just provide the rare vintages for the next auction.

The whole process sounds like a self-sustaining perpetual-motion machine which keeps money moving toward the worthwhile causes that usually benefit from such activities. A more thoughtful question to ask is how these old wines became so wonderful in the first place when enology and wine quality control in the early 19th century was at best an infant body of knowledge.



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Another fact that has often struck me as odd is that century-old wine, which can still demand such awesome prices, is a *consumable product*. Wine stands alone in the antique food and beverage category. Not even the most avid gourmand gets excited about a can of 50-year-old tuna or vintage cake mix. (2,000-year-old Chinese eggs maybe!)

The winemaker of the 1800s worried more about racking during the right phase of the moon than he did about ultrafiltration, induced malolactic fermentation or filterable non-flavonoid phenols. There is certainly no need to return to that less complicated era just to see if an 1861 Château Haut-Brion can be reproduced without the very sophisticated quality control now available to us.

Spinoff From New Enological Technology

When a new development in winery process equipment or technology crosses my desk, I view it in three ways: 1) Does it make sense in terms of process and product? 2) Do the benefits outweigh the costs? and finally 3) What is the impact of such a process change on the winery wastestream and waste handling both positive and negative?

Many large wineries in California use an ion-exchange column for removing potassium from white wines to achieve cold temperature stability. This is not, as the subheading of this column suggests, 'new technology' but illustrates a related point.

The waste brine from this process has a total salinity approaching ocean water, but with a concentration of potassium-ion higher than sea water. Depending upon the resin regenerant material used (sodium hydroxide or ammonium hydroxide), the brine waste can contain significant concentrations of sodium or nitrogen-ions in one form or another.

Disposal practices in California for ion-exchange column regeneration wastes were challenged in 1983 and salinity limitations were proposed regionally and basin-wide by the State to protect groundwater and surface water supplies. The Wine Institute's Energy and Environmental Studies Committee sponsored UC Davis research to more specifically identify the adverse impacts of deep percolation of ion-exchange wastes on ground water resources and to propose ways to mitigate the problem for wineries.

To the best of my knowledge, the issue has not yet been resolved and research is still in progress. In this example a 'new technology' did not impact the large winery wastestream, but more stringent water quality discharge standards led to the described impact.

Two variants of bentonite fining for removal of unstable proteins are worth mention as new technology with the potential for influencing the winery wastestream. One is ultrafiltration, by which, claims one of its commercial proponents, "oxidized and polymerized phenols, heat-unstable proteins, yeast and microorganisms can be removed in a single step," (**PW**, Vol.6, No.1, May/June 1985). Eliminating bentonite fining from the winemaker's recipe book would certainly constitute a large technological step forward (all things remaining equal on the wine sensory evaluation side of the ledger). The economic implications of ultrafiltration as a replacement for bentonite fining is a decision any particular winery would have to make after a careful economic analysis of the labor, materials, energy, and product quality equation that relates to the winery's own way of doing things.

The manufacturer of the above ultrafiltration system (Millipore Corporation) kindly provided me with further information on performance specifications and in-winery experiences with the equipment as reported by Barry Gnekow of J.Lohr Winery (**PW**, November/December 1984).

A small winery on septic tanks must be alert each year to prevent the accidental discharge of bentonite lees into the septic system. The conversion to ultrafiltration fining might prolong the life of the winery's leachfield and simplify white wine processing in general.

For a winery which has just invested in a lees filter, the ultrafiltration idea comes a little late or at the very least reduces the utility of that piece of equipment. For larger wineries with more sophisticated wastewater treatment facilities, the elimination of bentonite from process wastewater or special handling and disposal of bentonite lees is probably not a major winery problem. With the lees filter, disposal of semi-dry filter cake or spent filter pads, the liquid-to-solid phase transformation makes handling and disposal of the troublesome process-residual greatly simplified.

The ultrafiltration system manufacturer also claims a 5% higher yield of product (over and above net yield after using a lees filter). This additional product salvage, if universally applicable, would have to be factored in as a significant 'plus' into any economic analysis governing a front-office decision on purchase.

Unstable Protein Removal System No. III

The May/June 1985 **PW** story, "New Protein Removal Process", describes the so-called 'W.R. Grace System' for removing unstable proteins from wine. Sensory tests were performed by Ann Noble of UC Davis which compared 'W.R. Grace System'-treated white wines with white wines that underwent conventional bentonite fining.

The calibrated mouths used in the sensory tests could find no significant differences between wines fined conventionally and with the new technique. The story further states that the system won't be commercially available until fall 1986.

The W.R. Grace System differs from the previously described ultrafiltration in that it utilizes a column packed with a 'proprietary synthetic hydrated alumino-silicate'. This filter media apparently has a remarkable ability to selectively adsorb the unwanted proteins. Regeneration of the spent media is reported as part of the process, but the regenerant is not specified. Limited research led me to believe that the regeneration process is also proprietary and may not be known until the process is ready for commercial sales. (It may be something as innocuous as using distilled water . . . let's hope so).

Also to be considered is the number of regenerations that the media will endure without replacement. Fortunately, hydrated alumino-silicate, unless it contains some mysterious chemical binders, is not on the Hazardous Waste Hit List for California at least, so that special handling or disposal would not emerge as a winery problem. Both of the processes offer to wineries a chance in the near future to simplify one of their more imprecise subprocesses and in so doing make life at the business end of the industrial sewer less troublesome.

Technology Assessment

A number of years ago while pursuing advanced degrees at UC Davis, I became involved in a research project for the National Science Foundation under the broad heading of 'Technology Assessments'. The projects that caught the eyes of the NSF principals were those for which the long- and short-term consequences (economic, social, environmental and resource-related) were unknown or at best only qualitatively known. (This method of finding out what was good and bad for us pre-dated the National Environmental Quality Act of 1968.)

What I have been doing in this article is leading you through a very one-sided technology assessment to probe the new processes to see how they might affect the winery waste-stream and winery waste handling in general. I will leave it to you, the **PW** reader, to fill in the rest of the assessment matrix.

Technology Assessment Matrix For Protein Removal by Ultrafiltration or Packed Column

Technology Assessment Category	Impact	Author's Hints
Resources		Overabundance of bentonite clay
Economic		Bentonite clay industry goes under
Social		Winemaker is no longer challenged and opens sushi bar in Healdsburg, CA
Environmental		Disposal of lees filters becomes regional problem

You did so well on the T.A.-Matrix that I am going to give you a chance to prove how knowledgeable you are on a technology trivia quiz.

What were the major technological develpoments that can be associated with the following industries?

1) Forest products ________________

2) Warehousing ________________

3) Electronics ________________

4) Paint ________________

5) Tomato ________________

6) Aircraft ________________

7) Shipping (cargo) ________________

8) Wine (California) ________________

9) Data processing ________________

Scoring:
0-1 Hopeless
2-5 OK
6-8 Sharp
9 Genius

Answers are on page 39.

David Storm is president of Storm Engineering and owner/winemaker of Winters Winery, Winters, CA.

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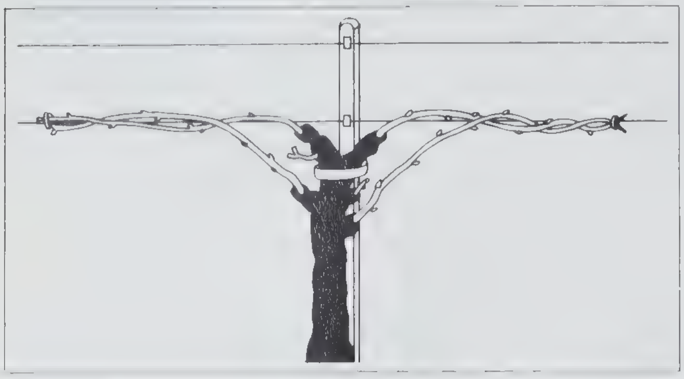
Canes or Cordons for Premium Grape Varieties?

by Mike Marcley



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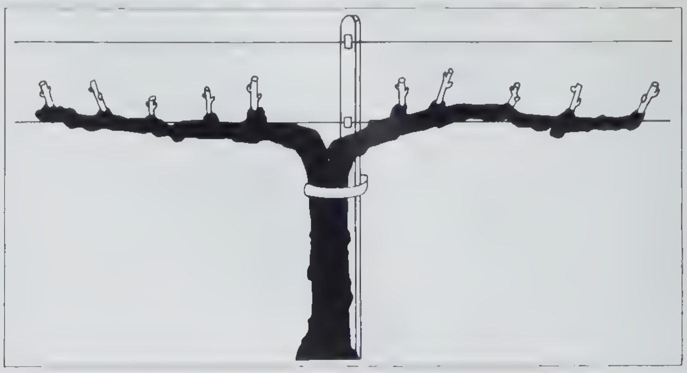

"Most of our small-clustered premium varieties (Chardonnay, Sauvignon blanc, Pinot noir, Cabernet Sauvignon and Merlot) have been cane-pruned for the past 30-40 years," says Bob Sisson, Director of Cooperative Extension for Sonoma County, CA.

"The aim was to get as much fruit on a particular vine as its canopy could ripen in the specific growing situation (soil and climatic effects on vine vigor and capacity). Cane-pruning vines seemed the best way to do this, but now growers would prefer spur-pruning these varieties to cordons for economic reasons.

"Most varieties, if everything is done properly, will perform as well on cordons as on canes. But problems, such as failing to establish good spur positions on future cordons, can reduce yields of spur-pruned vines. When spurs are too far apart on cordons (8-10 inches), it's not possible to leave the same number of buds as when vines were cane-pruned, so yields are reduced," Sisson added.

Converting vigorous varieties, like Sauvignon blanc, which can normally carry four or five 15- to 17-bud canes and replacement spurs in good growing conditions, to cordons with the same crop level often seems impossible. Training these vines onto trellising that apparently doesn't leave enough room for the necessary vine structure often results in shoot and fruit crowding, bunch rot and harvest problems. When these problems are not yet apparent (e.g. 5- to 8-year-old vines originally trained to cordons on narrow crossarms 12-16 inches wide), spur pruning may look like a viable production system.

Dale Goode, vineyard manager at Alexander Valley Vineyards, has had both Chardonnay and Johannisberg Riesling vines of the same age, on the same soil, trained to either canes or cordons. After three years of trials (conversion to cordons in 1979 and yield comparisons from 1982-1984), he went back to cane pruning because yields had been reduced by as much as 2.5 tons/acre on Chardonnay and 1-1.5 tons/acre on Riesling.

"We're on very fertile soil here," says Goode, "and have found it necessary to leave four or five 10- to 12-bud canes to keep the Chardonnay vines in balance and get yields of 5-6 tons/acre. We couldn't get more than 3.5 to 4 tons/acre on cordons, even when we left 11 spurs on a side and one 10- to 12-bud 'kicker' cane/side. We got the same effect with the cordon as we do when we don't leave enough canes. The bunches are stringy and full of shot berries. The quality of fruit is better when the load on the vines is enough to keep the vine in balance.

Artwork courtesy of Division of Agriculture and Natural Resources, University of California

"There was only a 1 to 1.5 ton/acre difference on Riesling, but at $500/ton it wasn't economical to stay on cordons because there's only about $100/acre difference in pruning costs ($175 for cane and $70 for spur). Spur pruning to bilateral cordons is successful on our reds (Cabernet Sauvignon, Zinfandel, Pinot noir and Merlot) because yields are the same as they were on canes and we save more than $100/acre on pruning," he claimed. Cordons also work well on Gewurztraminer, Chenin blanc and Pinot blanc.

Goode has also attempted to establish Sauvignon blanc on cordons to reduce pruning costs. Unfortunately, his trellis system wasn't large enough to accommodate the necessary vine structure. "We were using a narrow 'T' trellis with 12 inches between the fruiting wires and were ready to establish 4 cordons if necessary. It was soon apparent that even with 4 cordons, shoot and fruit crowding would lead to severe rot problems, so we went back to canes.

"Bunch rot can be a major problem in many locations in the North Coast counties, especially on white grape varieties. Spreading the fruit out and opening the canopy help prevent rot. Both are more easily accomplished on cane-pruned vines than on those that have been spur-pruned on cordons," he explained.

Spur pruning to bilateral cordons is the most economical system for grape production when trellises can be modified to support the necessary vine structure and when bunch rot is not a major problem.

Tim Murphy, vineyard manager at Murphy Ranch, Geyserville, agrees that spur pruning to cordons is much less expensive (about ½ the cost) than cane pruning. "You can train someone to prune to cordon in about 15 minutes, but cane pruning is much more difficult to learn," he explained.

He has grown Cabernet Sauvignon, Sauvignon blanc and Merlot on both canes and cordons. He prefers cordons for his Cabernet and Merlot and canes for Sauvignon blanc in his situation (deep fertile soil—6-foot clay loam).

"We T-budded some 15-year-old Merlot vines to Cabernet Sauvignon in 1981. These were hillside vines growing next to some 15-year-old, cane-pruned Cabernet Sauvignon. The cane-pruned vines had up to four 12- to 15-bud canes and two-bud replacement spurs (about 56-68 buds total). Vines trained to bilateral cordons had 5-7 spurs/side (close to 30 buds/vine) but produced the same amount of fruit (3 to 3.5 tons/acre) as the cane-pruned vines," he added.

Due to the blind bud problem on cane-pruned Cabernet Sauvignon (the central 2-3 buds on canes often do not develop), only about 60-70% of the buds retained at pruning will produce shoots. This means that Murphy's cane-pruned Cabernet potentially had only 40 shoots compared to nearly 30 for the spur-pruned vines.

"Set was better and clusters tighter on the cordon vines than on cane-pruned vines," continued Murphy. "Berry size was about the same for both systems as was the harvest composition (23° Brix, 0.83 titratable acidity and 3.29 pH). Five of our 18 acres of Sauvignon blanc were trained to cordons as a trial. We had a double crossarm trellis system (18-inch 'T' at 42 inches and a 24-inch 'T' at 56 inches above ground) to support quadrilateral cordons if this became necessary.

"The cane-pruned Sauvignon blanc vines were on a two- or three-wire vertical trellis with wires eight inches apart. There was a 24-inch crossarm above the second wire on the two-wire vertical system. We left three or four 12- to 15-bud canes and replacement spurs on cane-pruned vines and three or four 6- to 7-spur arms on similar spur-pruned vines. Both systems ended up with the same amount of fruit (5 tons/acre) but it was in the wrong place (too congested and full of rot) in the cordon system.

"We've just finished converting some of our hillside Merlot to cordons and so far it looks pretty good. 1984 was the first year these vines were in full production and yields were 4.5 tons/acre compared with 3-3.5 tons/acre for cane-pruned vines.

"From now on, all the reds we put in will be on cordons. We've shown that cordons are no good for Sauvignon blanc in our situation and I'm not convinced by anything I've seen or heard that they'll work on Chardonnay here either," Murphy concluded.

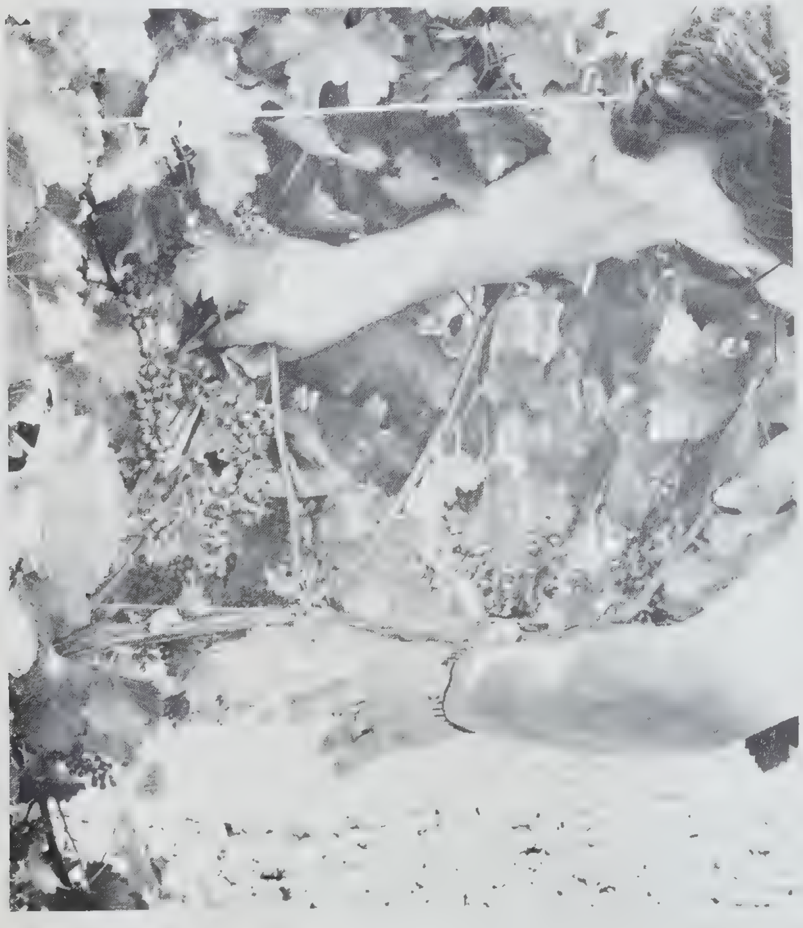

Fig. 1: Chardonnay fruit on shoot growing from spur

Mike Mazzoni, vineyard manager at Mazzoni Vineyards, Cloverdale, CA is one grower who has been successful with both Chardonnay and Sauvignon blanc on cordons. When he planted Sauvignon blanc in 1979, he decided to train the vines to cordons for economic reasons. These vines did so well that he decided to convert 15 acres of his cane-pruned Chardonnay to cordon in the 1984 winter.

"Those vines were yielding 6 tons/acre with four 15- to 17-bud canes and four replacement spurs," Mazzoni explained. "Growth was so good that I was able to leave two of the old canes with 6-8 spur positions each as cordons plus two 12-bud 'kicker' canes.

"By leaving essentially the same number of buds, we didn't lose any crop during the conversion. We got 5.5 tons/acre in 1984, but seasonal differences can affect yields this much in any year."

His vines are on AxR rootstock with 8x11 spacing on a deep (12-foot) clay loam. The Chardonnay is on a double crossarm system with fruiting wires 12 inches apart and 48 inches above ground. Foliage wires are 14 inches above this and are 16 inches apart. Maximum light penetration is achieved by putting the 'kicker' canes on alternate foliage wires opposite cordons on the lower fruiting wires.

A major reason for trying this system was to reduce the rot problem on both Sauvignon blanc and Chardonnay. Mazzoni feels that by leaving about 6 inches between spur positions and by putting 'kicker' canes above and opposite the cordons, he can spread the fruit out enough to minimize rot. This also allows sufficient light penetration to maintain fruitfulness. There was fruit on shoots from all spur positions we checked at random and on shoots arising from even the basal buds of the 'kicker' canes (Fig. 1).

"In 1984, we harvested Chardonnay in mid-September and the composition was 22.5° Brix, 0.7 TA and 3.4-3.5 pH. Fruit quality has not apparently been affected," Mazzoni claimed (1984 was a hot year).

"We inherited the trellis system on Chardonnay but are putting the Sauvignon blanc on our own system. The lower 'T' piece is 54 inches above ground and is 24 inches wide with fruiting wires 16 inches apart. Foliage wires are 14 inches above this and 18 inches apart on the upper 'T'.

"Some people claim that we will run into shading problems and resulting crop loss as our Sauvignon blanc gets older (10 or more years old) and larger, but so far, the system looks very good. Even the Chardonnay, which is 13 years old, wasn't apparently affected by putting it onto cordons, but we won't know the full effect on fruitfulness until the 1985 harvest," Mazzoni concluded.

Rich Thomas, viticultural consultant and lecturer at Santa Rosa Junior College, agrees with Sisson that many growers would like to convert their small-clustered, premium white varieties (Chardonnay and Sauvignon blanc) to cordons mainly to save on pruning costs. Both warn that this conversion is not always feasible.

"I've got 13-year-old Chardonnay on both canes and cordons at the College Farm (off the Trenton-Healdsburg Road in Santa Rosa) and haven't been able to get as much fruit (5.5 tons/acre) on cordons as on canes," Thomas claimed.

"If you can't get the same tonnage and fruit quality, there's no reason to go to cordons. Let's look at total costs, it can

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cost up to $200/acre to cane-prune Chardonnay and only $90/acre to spur-prune. That looks like a savings of more than $100/acre.

"Using $1,000/ton for Chardonnay fruit, if the yield is reduced by as little as ½ ton/acre during conversion, it will take 5 years to pay for the operation if there is no further loss in yield. If yields are consistently lower (even by as little as ¼ ton/acre) on cordons, it's economically better to stay with canes," he concluded.

Chardonnay at the College Farm is on a standard 2-wire trellis system. Fruiting wires are 54 inches above ground. Foliage wires are 14 inches above the fruiting wires.

"When they were cane-pruned, we left four 14-bud canes and 7 replacement spurs. We actually left more buds with the cordon system (12 spurs/side on bilateral cordons and a 14 bud 'kicker' cane/side on the foliage wire directly above each cordon), but never got more than 3.5 tons/acre," Thomas reported

Shading may have contributed to these low yields because many shoots arising from the cordons had no fruit at all while shoots coming from the higher 'kicker' canes all appeared to have one or two clusters (Fig. 2). But Thomas believes the clone of Chardonnay (FV 109) may not be good for his particular growing conditions.

Tom Rochioli, winery manager at Rochioli Vineyards in Healdsburg, has Chardonnay on cordons to enhance [illegible] quality as well as to reduce pruning costs. "If you cane prune Chardonnay here," Rochioli explained, "you can get 6-8 tons/acre. On cordons, we consistently get 3.5-4 tons/acre which is better for wine quality here.

"It's easier and less expensive for us to have Chardonnay on cordons (6-7 spurs/side) and shoot-thin leaving only shoots coming from buds we left at pruning than it is to have cane pruned vines and have to remove up to 50% of the crop in summer to achieve our ideal yields (composition of his 1984 Chardonnay was 23.2° Brix, 0.97 TA and 3.25 pH). Achieving sugar levels isn't a problem here, but larger crops ripen so late that acid levels fall off."

Rochioli would like to have his Sauvignon blanc on cordons too, but feels that the 26- to 27-year-old vines on six-foot sandy loam with 14-foot row spacing and 8- to 10-inch trunk diameter would require a huge trellis and probably be unmanageable on cordons.

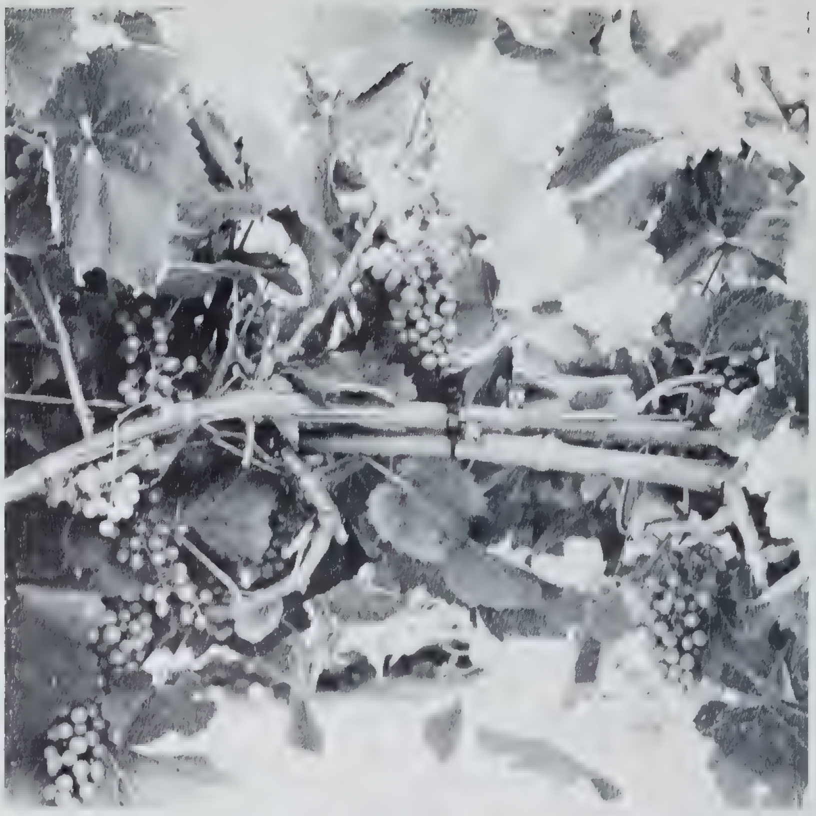

Fig. 2: Chardonnay fruit on shoots coming from 'kicker' canes on top of foliage wires at SRJC farm vineyard.

"Sauvignon blanc on cordons is a rarity to me," adds Rochioli, "I haven't heard of anyone who has done this successfully. Converting our vines to cordons and maintaining our low yields would leave them severely out of balance with too much vegetation and subsequent bunch rot problems."

Establishing or converting small clustered, premium white varieties may be possible if vine growth can be evenly distributed on a suitable trellis as Mazzoni has so far demonstrated. But, as Sisson warns, each situation is different and ultimately growers have to find the best system for their particular vineyards.

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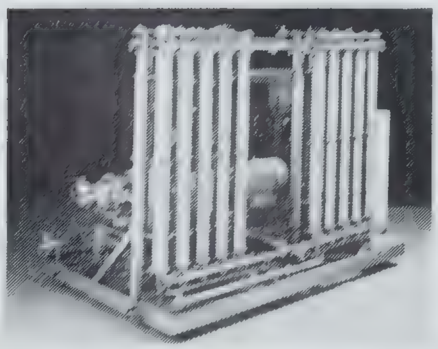
Barry Gnekow, Winemaker



In the typical Millipore ultrafiltration system pictured, oxidized and polymerized phenols, heat-unstable proteins, yeast and microorganisms can be removed in a single step. And ultrafiltration produces a 5% higher yield of high-quality product wine than with fining and traditional filtration techniques.

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RMS Alambic Brandy— French Tradition and California Innovation

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RMS

California Alambic Brandy

Rémy Martin of France and Schramsberg Vineyards of California established the RMS partnership to produce California Alambic Brandy using traditional French methods in 1981. A new distillation facility containing specially hand-crafted copper pot-stills (alambics) was completed prior to the 1984 harvest in Carneros, at the southern end of Napa Valley, CA. A temporary distillation facility, set up in early 1982, produced brandy from the 1982 and 1983 harvests for barrel ageing.

Over the centuries, distillers developed the art of distilling white wines in hand-crafted, onion-shaped, copper pot-stills over an open flame. A primary distillation removes the purest and cleanest-tasting alcohol (Brouillis) at around 28% from the other alcoholic fractions of the distillation. The first distillation of 9-12 hours duration produces 200 gallons of Brouillis (containing the aromas and flavors) from 660 gallons of wine.

A second 12-16 hour distillation of 660 gallons of Brouillis produces 200 gallons of brandy at 70% (140 proof). Heads, the first recovery, with intense fruity aromas when high quality wines are distilled, are too aggressive and tend to mask other aromas. Tails, the last to be recovered, has soapy character. Heads, seconds and tails are redistilled further in the second distillation of the following lot.

Brandy masters have developed the art of separating heads and tails from the heart or brandy of the second distillation and ageing these brandies for given amounts of time in barrels of varying ages to achieve their own styles.

The RMS stillhouse is 45′ X 120′ and contains eight 600-gallon copper pot-stills. Flame heats and alcohol levels are constantly monitored by still operators. A second building, the cellar (5,000-barrel capacity), contains 90-gallon Limousin oak barrels (2,500 at present) of varying age from new to 8 years old.

"The vanilla character which is typical of Limousin oak is extracted very quickly from new barrels," says Joe Norman, resident brandy maker. "This and other oak characteristics can overwhelm the natural fruitiness of some grape varieties. We have to continually monitor the time brandies of each variety are kept in oak of particular ages.

"For example, Chenin Blanc in our experience has always been very perfumy and flowery in aroma and can only take a small complement of oak. It doesn't have the depth of a Pinot Noir, which is very dynamic and complex and can carry more oak character.

"There's no formula. It's all going to come down to blending in the end. We have a tremendous aroma and flavor 'bank' to work with. We bought six different grapes from five regions and from several vineyards within a region.

"We're continually tasting and moving our stocks to achieve the best blends. We might leave 10% of a particular brandy in older oak and move 60% to 2- or 3-year-old oak and leave the rest in new oak. We always have stocks of brandies with different characteristics for blending.

"We have only used wine from the traditional Ugni Blanc for one year (1984). I am not yet ready to comment on this variety's characteristics here in California. We have used wines from other varieties such as Palomino and Muscat in addition to Chenin Blanc, French Colombard, and Pinot Noir for at least three years and are familiar with the particular flavor and aroma characteristics of each."

RMS has purchased wines for experimentation from the Central Coast, Mendocino, Napa, San Joaquin, and Sonoma regions, but Norman is not ready to say which area gives the best wine for brandy production. Wines from each area may be necessary to add depth and complexity to the final blend.

Norman explains that seasonal differences in the same area can affect the brandy. "We have tasted brandies distilled in '83 and '84 and the '83 Pinot Noir from Napa was very, very intense while the '84 Pinot Noir brandy from the same source was very fruity with a little less depth than the '83. That has to be a seasonal effect because the growers haven't changed their viticultural practices."

"I don't want wines to be less than 7.5% alcohol," says Norman, "because at those sugar levels, the grapes would be too green and have little natural fruit quality. Acid and pH are seldom problems when grapes are picked in this range."

Robert Léauté (L) and Joe Norman (R) discuss controls of pot-still.

Norman has limits for volatile acidity (.015 is normal and .034 is the highest he's seen) and total phenol content (200 ppm is the ceiling). These compounds and others like butyric acid and acroline (plastic taste and smell) are concentrated in the distillation process and would ruin the brandy if present. The routine way to detect these compounds is by pilot distillations in the laboratory.

"All of the wines are checked by distilling seven gallons in our lab still before purchase. We've never found defects caused by bacterial spoilage in any of the wines to date, problably because the winemakers have followed our suggestions for fruit handling and winemaking," comments Norman. "We use only hand-picked fruit. We prefer bladder presses for juice extraction because they give the lowest phenol concentrations.

"Only free run and light press juice is used, up to the yield of 150 gal/ton. The juice is allowed to settle overnight before being racked off the gross lees and pumped into fermenters. A freeze-dried Champagne-strain yeast is used to produce a complex wine. White wine fermentation temperatures are higher than usual because we are using a Rémy Martin technique of fermenting at 65-70°F.

"Once again, there is no formula as we are still working with variables available in making our California product. We have tried malolactic fermentation with our Pinot Noirs and found that the flavor becomes much more complex but the fruity aroma is decreased. We've had a French Colombard complete malolactic and were able to detect the typical diacetyl in the distilled wine. Only time will tell if this character is enhanced or dissipated while in oak.

"We chill the wines to 50-55°F right after fermentation and hold them in cold storage until distillation. There is an 0.80*u* membrane filter in line at bottling."

Following the Rémy Martin method, the rows of barrels are stacked over a natural clay floor so that 90-95% humidity can be maintained. The barrels are not topped.

Robert Léauté, Rémy Martin's chief cellarmaster, visits 3 or 4 times/year to monitor critical production stages (fermentation of wines and subsequent purchase of wines for distillation, beginning of distillation and end of distillation when the brandies are tasted and specific oak ageing requirements are determined).

"Each season, we take samples from every tank of wine for Léauté to taste and determine possible distillation methods. We then distill them in several different ways (various times at various temperatures). He chooses the best method for each lot of wine. Distillation continues through winter and when all the brandies have been collected, he returns for the pre-blend tasting.

"Léauté has a great knowledge of brandy," says Norman, "a well-trained nose and a descriptive vocabulary of hundreds of aromas he can consistently recognize in brandies. Rémy Martin has a panel of tasters that always use the same vocabulary for brandy aromas. Such terms include many fruit and flower descriptors like flower of the vine during the blossom stage.

Norman comes well-prepared to work with Léauté in achieving fine brandy blends as his career has included working with wines made from grapes of individual vineyards at Fetzer Vineyards in Ukiah. Norman has been making brandy for RMS since 1982.

"For the first eight months after the partnership was formed, Jack Davies, president of Schramsberg Vineyards, and I were just organizing the business, arranging grape purchases and getting prepared. Then in the summer of 1982, equipment started arriving and our time was occupied with assembly.

"Robert Prulho, who hand-assembles the stills for Rémy Martin in Cognac, sent his son and six craftsmen to individually assemble our eight pot-stills. Each is slightly different and were assembled separately. Parts of one cannot be used on another.

"We have a great opportunity here to make a very fine and unique brandy which optimizes the best characteristics of several different grape varieties. Our aim is to make an individual brandy following the Cognac method. We want to create a product not presently available. I think we're going to find something of great value by blending what we have in the barrels now. It's exciting."

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Méthode Charentais

by Eleanor & Ray Heald

Cognac production has general threads of continuity based on tradition. Each firm imprints its individual style by variations of the traditional method. The following discusses general methods of production and highlights Rémy Martin's techniques, since this house is the 'French connection' to the recent first release of RMS, a California brandy made in the Cognac tradition.

Records of cognac production in southwestern France for the two *départements*, Charente and Charente-Maritime, have existed since 1610. With only minor changes in the shape of the Alambic potstill as the fuel source changed from wood to coal, and now gas, distillation remains the traditional Méthode Charentais in 1985.

The city of Cognac, at the heart of the region of the same name, has a population of 22,000. It takes the entire surrounding region to provide the 100,000 employees needed for the cognac industry. Every stage of production is localized: grape-growing, distillation, manufacture of traditional potstills, coopering of Limousin oak barrels used exclusively in the ageing process, and production of various-shaped bottles considered part of a cognac firm's signature.

Since 1941, the Bureau National Interprofessionel du Cognac (BNIC) has acted as watchdog over all production, distribution, international promotion and protection of the cognac name. Prior to the 1980s, the region exported one million cases of cognac annually to the USA. This quantity has increased to more than 2.2 million cases and represents more than 20% of worldwide sales of cognac—France's number one export product.

According to Patrick Quien of Rémy Martin (RM), "World popularity of wine is growing faster than any other beverage. This is particularly true in the United States and Australia. Brandy is the heart of wine—its quintessence. People who drink wine and are attracted to its taste eventually continue this enjoyment with brandy. Since the late 1970s, RM has doubled its shipments to the USA.

"RM thought it would be a good venture to use American wine and French know-how to produce an excellent brandy in the same spirit of cooperation as seen in the production of California sparkling wine. In 1981, RM launched RMS, a joint project with Schramsberg Vineyards.

"Although cognac can be produced only in France, brandy can be produced anywhere in the world. RM decided to use the Méthode Charentais with a California wine base to produce a brandy in America. We do not expect to duplicate the taste of cognac, but we do expect to market an excellent brandy."

Méthode Charentais can be divided into three distinct parts: (a) grape growing and fermentation, (b) distillation and (c) ageing and blending. Professionals specialize in one or possibly two parts of the method, but rarely does one facility perform all tasks from beginning to end.

Grape Growing and Fermentation

Ugni blanc, known elsewhere as Trebbiano, White Hermitage or St. Emilion, has become the principal cultivar in Cognac over Colombard and Folle blanche principally because of its disease resistance. Cognac production requires a finished white wine with 0.6-0.8 TA (expressed as sulfuric acid), 2.8-3.0 pH, 0.020 VA, 7-10% alcohol and less than 0.002% phenolics.

The wine must be very delicate and subtle, to prevent detracting from the taste and aroma of the final product. Although wines of several grape varieties could be used to produce cognac, those with strong characteristics like Riesling or Gewurztraminer are avoided because the resulting brandy has too much perfume.

Vintage variation has only a small effect on the quality of cognac. Any differences are equalized in the process of distillation. If the wine is 10% alcohol, 7 litres are needed to produce one litre of cognac, but if the wine has 7% alcohol, 10 litres are required to make one litre. The lower alcohol wine produces the more complex cognac because it retains the desired aromas and esters.

RM uses grapes exclusively from the Grande and Petite Champagne vineyard sites (*crus*). Demand for cognac produced from these top quality vineyards has increased in the last five years, and sales of RM products has followed suit. The remaining *crus* in order of decreasing esteem are: Borderies, Fins Bois, Bons Bois and Bois Ordinaires.

Using horizontal presses, a maximum yield of 70 hectolitres per hectare was established in the late 1970s because of an over-production problem. Until then, grape production in Cognac was not controlled.

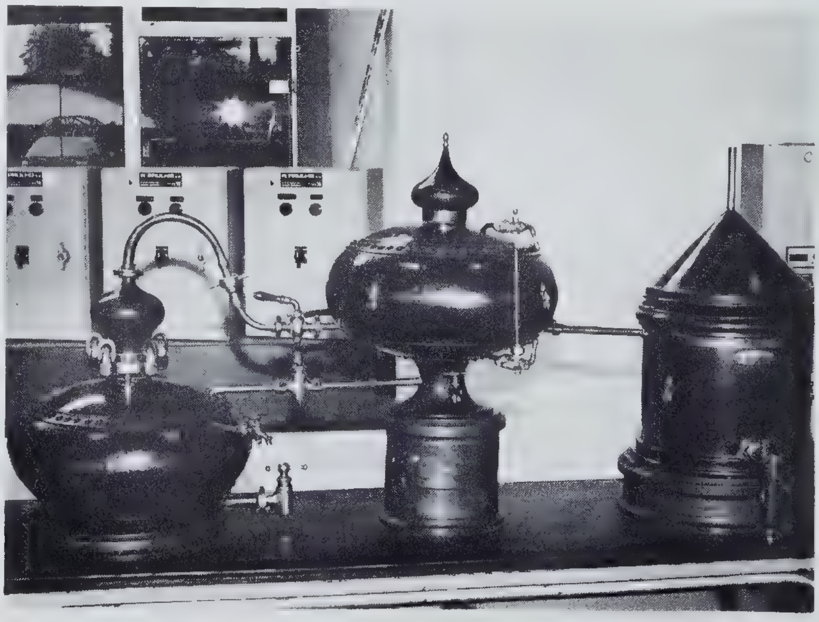
Only natural yeasts are used in the fermentation process. "SO_2 is not used as it would kill some elements we want to remain in the wine we will distill," stated Quien. "Any chemical additions are concentrated during distillation and give poor tastes and aromas. We add nothing; everything is perfectly natural."

Fermentation is completed at cool ambient temperatures and malolactic fermentation occurs automatically. Cool fermentation preserves fruit essences and esters, but because of the cool climate at harvest, temperature-controlled fermenters are unnecessary in October and November.

Distillation

The *bouilleur* (distiller) uses the traditional Charentais pot-still named 'Alambic', made entirely of copper, to separate the essence of the wine. The first distillation (*première chauffe*) results in a milky liquid (*brouillis*) containing 28% alcohol. In the second distillation (*bonne chauffe*), the head (*tête*) and tail (*queue*) are separated from the heart (*coeur*), which has an average strength of 70% alcohol. This is the *eau-de-vie* that will be aged and blended to produce cognac.

The capacity of cognac stills is regulated by law. Maximum volume of the still used for the second distillation is 25 hectolitres; the still used for the first distillation may be larger, frequently 50 or 100 hectolitres. Approximately 3,000 stills operate in the region.



Model of complete distillation apparatus at Robert Prulho, S.A., Cognac, France. (L to R) boiler, pre-heater and condenser.

RM distills *sur lies* using the stills manufactured by Robert Prulho, S.A. and other smaller companies. Prulho has developed a technique whereby the entire bottom cup of the boiler (cucurbit), which is in contact with the fire, is shaped by floturning a single piece of copper. This method offers advantages over the older brazed or riveted boilers because it maintains an even temperature, less copper is needed in its manufacture and the still's lifetime is doubled.

Ageing and Blending

Eau-de-vie de cognac is aged entirely in 90-gallon Limousin oak barrels, some as old as 50 years. Barrel ageing imparts tannin, allows oxidation and adds color to the otherwise colorless *eau-de-vie.*

The traditional stacking method is three high; however, many new warehouses use a system that allows the barrels to be placed six high on steel racks. *Eau-de-vie* is put in new barrels and transferred to older barrels as it ages. Even though humidity is maintained at 85-90%, approximately 3% of cognac evaporates annually, amounting to 28 million bottles for the region which are known as the 'angels' share'. Volume is adjusted each year to maintain the desired 6-litre air space (*ouillage*) at the top of each barrel with bungs loosely fitted.

The consistent taste of cognac is maintained by a 'master blender', often the fourth or fifth generation to practice his skill with the same cognac house. He has at his disposal a flavor bank of more than 350 cognacs of different age and origin. The process of blending these cognacs depends more on the blender's nose than his taste. Very little is tasted in the task that requires years of training and apprenticeship.

Over a period of six months before bottling, the last quantity of distilled water is gradually added to bring the cognac to the required 40% alcohol.

Since cognac is always a blend, the law prohibits any mention of age as part of the label. Quality grades established by law in 1946 guarantee the minimum age of cognac used in a blend and the BNIC has ruled on the minimum ageing period. Three Star or Very Special (VS) means that the minimum barrel age is 2.5 years, but frequently the average age is 5-9 years. Very Superior Old Pale (VSOP) has a minimum barrel age of 4.5 years with an average age that commonly reaches 12-20 years. Cognacs labeled Napoleon, Extra, XO, or Vielle Reserve have a minimum of 6.5 years barrel age with an average age that is frequently 30-40 years. The top of each producer's line includes 50-year-old cognac. These products cost as much as $500 per bottle on the American market.

Defined appellations used on the cognac label are enforced by the National Institute of Appellation of Origin (INAO). Grande Champagne, or Grande Fine Champagne, refers to cognac produced entirely from grapes grown in the Grande Champagne vineyards. Petite Champagne or Petite Fine Champagne must originate in the respective vineyards. Fine Champagne contains at least 50% Grande Champagne, the remainder being only Petite Champagne. The term Fine Cognac has no legal meaning. A cognac without these appellations can come from any vineyard in the Cognac district.

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New Building Caps V. Sattui Growth

by Diane W. Mayfield

The old joke goes, "How do you make half a million in the wine industry?" Answer: "Start with a million."

Building and operating a winery may be one of the most capital-intensive businesses today. Daryl Sattui, owner-winemaker of V. Sattui Winery in California's Napa Valley, has proven that it *can* be done—even if you start with almost no capital.

When Sattui decided in 1972 to resurrect the family wine business, which had flourished in San Francisco until killed by Prohibition, he possessed little beyond determination and tenacity. "I didn't know anything about wine, I didn't have any money, and I didn't have a location," Sattui recalls.

Now, ten years after he opened V. Sattui Winery in 1975, Sattui is celebrating the completion of his new $2.5 million winery building. Completion coincides with the centennial of his great-grandfather Vittorio's (the 'V' in V. Sattui) commencement in the wine industry in 1885. Both events were celebrated over the summer with parties for steady customers, local winemakers, and shareholders.

The new building represents the final embodiment of Sattui's dream of re-starting his great-grandfather's business. But $2.5 million winery buildings are not financed on dreams. Sattui describes the realities of financing a project of such magnitude.

"First, we had to pay off the remainder of the original loan on this property, about $47,000. Napa Valley Bank then gave us a loan for $1.2 million," he explains. "We originally budgeted about $2.1 million for this project, but it looks as though it'll be closer to $2.5 million by the time the building is finished. The other $1.3 million comes from working capital.

"Working capital includes receipts from our wine and food operations," continues Sattui, referring to sales from the winery's tasting room and deli. "The $1.3 million needed for the new building comes from sales over the last couple of years and anticipated receipts from the next 6-12 months." Sattui wines are sold primarily from the tasting room so that the markup for retailers and distributors is saved. A very small percentage is sold to four or five Napa Valley restaurants for added exposure.

Planning for the new building began over a year before actual construction started on June 2, 1983. Construction was planned in order to have space available for the 1984 crush, in addition to bottling and barrel ageing.

"The way I look at it," Sattui reflects, "is that we've been able to use this building since August of 1984. Even though it's not completed, we can still use it. So what we're doing, as we generate money in the business, is to turn right around and put it back into the building. I'm not going to borrow any more money, though. I'm going to be real cautious."

Cautious or not, few people are awarded $1.2 million loans. How does a small business qualify for such a loan?

"Everything I own is securing this loan—the winery, the inventory, the fixtures, my underwear . . . everything." A closer look at Sattui's collateral reveals quality wines that have garnered a number of medals and have people visiting the winery daily for a taste—or a bottle.

Quality came only after much experimentation and plain hard work. "I worked at several wineries to learn about winemaking before I opened V. Sattui Winery," says Sattui. "After I started the business, I made some pretty poor wines but kept experimenting to improve them. And I slept on the winery floor—it saved on rent."

Sattui started the business with $5,000 of his own and $53,000 raised from fraternity brothers and total strangers who thought it would be a good idea to invest in a winery. Sattui leased a 4-acre parcel of land in St. Helena from a real-estate broker, and exercised an option to purchase in 1980.

"My own money disappeared just on organizational costs," Sattui recalls. The borrowed money went toward the purchase of enough grapes and winemaking equipment to produce 1,800 cases. "But," says Sattui of that first year, "we sold much more food than wine." He is referring to the deli adjacent to his winery, a brainstorm that grew out of three post-college years in Europe. "Everyone in Europe drank wine with their meals. When I started the winery, I decided to provide a picnic ground and deli so people could enjoy a bottle of wine with lunch."

The picnic ground is situated on Highway 29 just outside the deli and tasting room, an invitation to lunch on a sunny afternoon. Sattui accepts responsibility for possible litter problems by providing large trash barrels and empty wine cases where picnickers can leave their empty bottles. The bottles are washed and sold for re-use by ENCORE.

Rumors that Sattui cared more about the deli than about winemaking were put to rest in 1984 when Sattui wines brought home no fewer than 15 gold medals. "Every one of the wines won at least two medals," Sattui recalls "and two of them—the 1980 Centennial Reserve Cabernet Sauvignon and the Madeira—won three gold medals each. *The Wine Spectator* reported that we won the most medals in 1984 of any Napa Valley winery, and we were third highest in the nation with over 60 medals altogether."

Today, wine sales equal 70% of total receipts, with food and gifts making up the remaining 30%. That 70% includes sales of 18,500 cases involving 10 different wines. With an average of 2,000 people visiting the winery each summer weekend,

Sattui's original 4,300-square-foot facility.

New 18,000-square-foot building.

and 500-600 on weekdays, Sattui wants to be sure that each will find something to his or her taste. "I want to have a style of wine for everybody that comes in that door. I don't want anybody to leave our place without finding something they like."

With this in mind, Sattui produces, from purchased grapes, a dry and a semi-sweet Riesling, a fruity Gamay, a red table wine, Sauvignon Blanc, Chardonnay, Zinfandel, Cabernet Sauvignon, and two dessert wines, a Muscat and a Madeira —quite a line-up for a small winery, most of which usually focus on only one or two varietals.

While all Sattui's wines have improved in quality over the years as Sattui perfects his winemaking skills, it is the Cabernet that is winning special accolades. "I've been buying Cabernet Sauvignon from Preston Vineyard in Rutherford since 1976," explains Sattui. "I like Dick Preston's personal involvement with his vineyard and his employees. I've got a 5-year contract with him and plan to keep renewing it."

Napa Valley Bank thus granted Sattui the loan. That money, along with working capital, has been used to construct an 18,000-square-foot, two-level winery along the lines of older California wineries with some European overtones such as hand-hewn cornerstones and underground ageing cellars. Quality materials were used, such as odd sizes of timber at a total cost of $100,000 to create less of a 'pre-fab' look. "The problem with using expensive quality materials in the beginning is that you have to continue with them all the way through," says Sattui. "If you don't, it shows.

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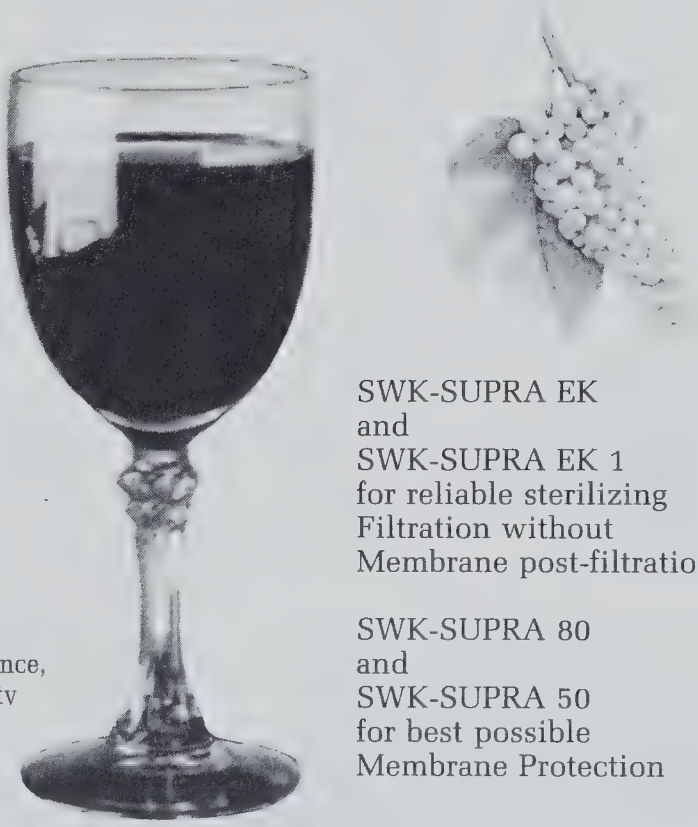

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"The original winery (built by the broker who leased me the property) totaled 4,300 square feet, including the 400 square foot tasting room. The new building has a public area of 5,300 square feet for special events and a 10,000 square-foot cellar. In addition, we rent a 6,000 square foot warehouse for extra storage space." The new building has a production capacity of 25,000 cases.

30 new stainless steel tanks have been purchased as well as a new 3000 L membrane press to replace a plate press, a new hopper and auger screw, a lees filter, and a complete automatic 1,000 case/day bottling line. New cooperage includes barrels from Demptos and Seguin Moreau. "Barrel ageing will take place downstairs in the cellar," explains Sattui. "We rotate our barrels over 1.5 years so we always have about 30% new barrels."

The upstairs wing will include offices, a conference room, and a new lab. "We run most of our own analyses, with ETS helping out when things get busy."

The building project includes highway improvements, so that people living near the winery have easier access to the road on busy weekends. "$75,000 covers improvements on the county road and the assessment for a new center lane for turning onto and off of Highway 29. $100,000 is for the parking lot," says Sattui. "The new parking lot actually has only 100 car spaces, 30 fewer than the original parking lot. That was a condition for obtaining approval from the county for new construction. We now have monitors to direct traffic in and out of the lot on weekends, and they give right-of-way to the neighbors. We stop access to the lot when it's full."

Sattui spent an additional $1 million raised from shareholders to purchase a 34-acre vineyard adjacent to Sattui's property. "Part of the vineyard is planted to Zinfandel, some of it 50 years old and very low-yielding; I plan to make a reserve out of those grapes. The rest is planted to Sauvignon blanc and Gamay, with about 10 acres unplanted. I'll plant those acres to Cabernet Sauvignon. I may T-bud the Gamay to another variety and plant more Cabernet.

"Eventually, I'd like to grow more than half the grapes I need for full-scale production. This will allow me more flexibility, and, since there may be a paucity of grapes in another 10 years or so, I won't need to depend on growers so much."

One thing Sattui has not spent any money on is new property for the building. "For a long time, I've envisioned a winery right under the trees on the original 4 acres. Unfortunately, that's where my house stood. So I moved the house." The house now stands behind the new building on the back edge of the property.

Upon completion, about the end of 1985, the new building will house all of V. Sattui's winemaking operations, which had formerly been cramped into the smaller, original winery and three leased warehouses nearby. The older building will continue to house the deli and tasting room. "There are no plans for a major expansion of the winery," Sattui explains. "We just needed the room to reorganize what we already have."

It's an impressive undertaking for a small winery. But as Sattui concluded, "It's worth it, because it's going to be here for a long time."

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Wood Case Purchasing Guide

Dark-stained wood box with silk-screened slide cover to hold three bottles for Sterling Vineyards produced by American Forest Products Company. (L)

Wood boxes including branded slide covers produced by Atlas Box Company. (R)

Many wineries have discovered the versatility of wooden packaging for shipping, protection, identification and display purposes. *PRACTICAL WINERY* surveyed suppliers to determine the choices available. Variety and individuality are the key factors. Sizes, shapes, materials, finishes and decorative applications are available to meet many different needs. Each of the participating suppliers is prepared to assist in responding to the customer's needs. When you contact a supplier, please mention having seen their listing in *PW*.

AMERICAN FOREST PRODUCTS COMPANY

San Francisco, CA

A wide variety of wooden wine cases are custom made by American Forest Products Company in their Stockton, CA plant. As there are no 'standard' sizes, any special requirements in terms of size, shape and capacity can be met.

Cases are predominently constructed of Ponderosa Pine. Typically the panels are finished S1S (smooth on one side) and resawn on the other. Other combinations are available, including all smooth surfaces to insure maximum tightness. Cement coated nails are used and brass coated nails are an option. Any piece over 6 inches wide is edge-glued for smoothness, sealing and strength.

Lid variations include nailed, hinged or sliding. Sliding lids may be flush, overlapped or recessed, with molded edges. They can be placed vertically in the back of 6 or 12-750ml bottle cases for display purposes, or framed for use as trays and wall decorations. A variety of brass hinges, including 'beer-case' hinges and small 'tri' hinges, is available. Rope and slotted handles are additional options.

A 3-cradle insert allows the stacking of 6 or 12 bottles so that labels show completely. Notches for inserts can be hidden. Specialty gift packaging includes a 'book' box, detailed to resemble a leather-bound book. It is designed for eight 50ml brandy bottles or two 375ml splits.

Case decoration is done by printing and silk-screening. The printing process utilizes curved brass plates on a rotary press. Machines with 2 drums are capable of printing 2 colors, consecutively. Costs are determined by the number of panels printed. Any style of lettering can be reproduced, and a branding effect can be achieved with a slight indentation.

Any quantity of colors can be combined in the silk-screening process to reproduce almost any desired picture. A large variety of shading is available and art specialists are on hand for consultation. Order time depends on quantity and complexity, but in general allow 4-8 weeks. A minimum order of 500 is necessary.

Inquiries to: American Forest Products Company, 2740 Hyde St., San Francisco, CA 94109, phone: (415) 775-6444.

THE BOX YARD

Fresno, CA

Standard wine cases are manufactured in 2, 3, 4, 6 and 12-bottle sizes, but any size or shape is available through custom order. Pine, redwood and oak are used, with sides joined by staples or nails. Lumber is cut and cases are constructed at the Fresno facility.

A variety of lids are available, including nailed or stapled, sliding or hinged. There is a wide selection of hinges. Lid edges can be molded, and may be used for decorative or display purposes. Both solid and perforated wooden inserts are standard, and rope handles are available as an option. Cases are finished according to customer order; smooth, resawn, or any desired combination of the two. A large 12-bottle Chest Case with an insert tray and solid brass hardware is a specialty. It is available in cedar as well as pine, redwood or oak.

Two design applications are available. Silk-screening in one color is the traditional method, but branding will be introduced in 1986. Requests for design assistance are accommodated. Case decoration costs depend upon the number of panels involved.

There is no minimum order and volume discounts begin with quantities of 500. Lead time necessary for new orders is 30 days.

Inquiries to: The Box Yard, 335 P St., Fresno, CA 93721, phone: (209) 264-8133.

SEE OUR AD PAGE 35

ATLAS BOX CORPORATION

San Francisco, CA

Cases to accommodate any size bottle or combination of bottles can be produced by Atlas Box. 1 to 4-bottle cases with or without wooden dividers for 375ml or 750ml bottles are available. 4, 6, 9 and 12-bottle wine storage cases with precision multi-bored holes for each individual bottle are standard. Also available are 6 or 12-bottle laydown-type boxes, fitted with slide tops.

Pine is the standard wood employed. Cement coated, galvanized or brass plated nails are used for joining. Sliding lids are usually provided, and can be used for decorative or display purposes. Nailed and brass hinged lids are also available. Rope handles are optional. Finishing techniques include both resawn and sanded faces and the combination of both techniques on a single panel is possible.

One color printing and 4-color silk-screening are available. Prices for design application depend on quantity, complexity, number of panels printed and number of colors selected. Allow 2-3 weeks for each new or re-order. No minimum order is necessary and quantity price discounts are given at 500, 1,000 and up.

Inquiries to: Atlas Box Corporation, 1111 Shafter Ave., San Francisco, CA 94124, phone: (415) 822-4050.

SEE OUR AD PAGE 42

CLASSIC CASES

Petaluma, CA

Classic Cases offers a wide variety of wine cases, including the traditional and gift format and custom designed cases.

Traditional design cases feature nail-on lids and cradle inserts to function as shipping units and are designed specifically for each bottle. The 2-point suspension of the cradle insert system offers greater protection for the bottles. Standard sizes include the 1, 2, or 3-bottle, 1-magnum of table wine or 1-bottle of sparkling wine. Brand case choices include 6 and 12-bottle, 6-magnum, and oversize bottles, etc.

Gift cases have sliding lids and compartments for each product and are suitable for retail rooms and/or marketing programs. Rope handles, brass hardware and hidden inserts are available.

Ponderosa Pine is the standard wood used. Other woods such as redwood and cedar can be ordered. Wood on all cases has a finished smooth textured exterior. Joining methods include gold galvanized nails, staples and tonque and groove for additional strength and to prevent warping.

Classic Cases has a customized branding procedure. Branding dies are made of a special alloy that permits use of extremely high heat—over 1,000°F in combination with pressures in excess of 6,000 lbs to produce dark brands. The dies are acid-etched, allowing for maximum retention of detail and are interchangeable. Using the same logo design, a winery can change varietal names, vintages, etc. Dies come in a variety of sizes and a one-time charge makes them the winery's property. A new multi-tone branding process permits shade tones.

Silk-screening in combinations of up to 4 colors is available. Reproductions of most pictures are possible, and there is an in-house artist for consultation.

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Chest-style boxes are available with brass hinges and hasps in several sizes including a 12-bottle champagne chest. Custom boxes in oak or redwood with brass or leather hinges are also available. Handles are made of sisal rope and brown polycord. On larger boxes, grooved handles can be cut.

There is no minimum order and price discounts are based on volume, with breaks at 100, 250, 500, 1,000 and above. Average lead time is 8 weeks. On custom work, an exact bottle sample and a black and white stat of the artwork to be reproduced is necessary. If artwork needs to be created, there is an in-house consultant for assistance.

Inquiries to: Napa Valley Products, 849 Jackson St., P.O. Box 3747, Napa, CA 94558, phone: (707) 252-1978.

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Three methods of applying decoration are available. In the branding process, the heat is controlled to vary the darkness desired. Brass plates are used in the printing process. Silk-screening is available in 4 colors including a screen process to produce shading. The cost of case decorating depends on several factors: whether a new or repeat order, quantity, number of panels decorated, number of colors, and complexity of design and method used. Design artists are available for consultation.

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Contribution of Grape Flavor to Wine Quality

by C.R. Strauss, B. Wilson and P.J. Williams
Australian Wine Research Institute

In these days of advanced processing technology, winemakers can exercise considerable control over microbiological aspects of fermentation. Accordingly, wines can be produced with a desired fermentation bouquet and with no off-flavor development after fermentation. This control over production serves to emphasize the importance of the source material to the final outcome. It is apparent that grape flavor is one of the most important positive determinants influencing wine flavor and hence wine quality.

In order to estimate the probable extent of knowledge about the contribution of grape flavor to wine quality 15 years into the future, we should examine developments in the area over the past 15 years. The present, then, serves as the mid-point of our timeframe.

The unique aroma of muscat grapes has been a prime source of interest to winemakers and viticulturists because it has long been recognized that these grapes are the most aromatic and flavorful of all *vitis vinifera* varieties. Furthermore, early enologists most probably chose these varieties for analysis because the chances of success for finding the flavorants in these cultivars appeared greatest.

However, even by 1970, little was known about muscat flavor (and hence less was known about the flavor of other non-muscat varieties), but it was recognized that monoterpenes were important and of the few compounds identified, linalool and geraniol were regarded by some researchers as crucial to the characteristic muscat aroma.

From a sensory viewpoint, it was found that a general correlation existed between monoterpene concentration within individual grape varieties and the aroma and flavor intensity of those varieties. Thus, it could be said that the more aromatic and flavorful a grape variety (whether muscat or not), the higher the concentration of volatile monoterpenes in the fruit.

By the mid-1970s, a few more volatiles, including the important aroma compound hotrienol, had been discovered, and German enologists were attempting to empirically assign varietal differences based on ratios of monoterpenes within juice extracts. However, at about this time, a French research group obtained evidence for the existence of bound, acid-labile non-volatile monoterpenes in muscat grapes, complicating the picture considerably and causing a flurry of futher research in the area.

Monoterpenes and Aromatic Grape Varieties

From work carried out at the Australian Wine Research Institute, many questions regarding the monoterpene flavor composition of aromatic grapes have now been answered. This work has involved several years of painstaking analysis but has led to discovery of previously unrecognized and flavorless, but nevertheless very reactive, forms of monoterpenes in the grape, *i.e.* a complex of glycosides and a range of hydrophilic polyols.

In-depth studies of the behavior of these various monoterpene forms have allowed the delicate inter-relationship between components to be rationalized. Without this understanding, no progress in the area of grape flavor could have taken place. These exciting developments now form the basis of a new perspective of not only grape, and hence wine flavor, but of flavors of many other fruits as well.

Now that the secrets of the berry flavor complex had been unlocked we were, for the first time, in a position to study the relationship between grape flavor and pre- as well as post-harvest treatment of grapes. For example, we saw the need for a simple and rapid assay for grape terpene content. The method, developed in our laboratories, came as a result of the progress mentioned above and now allows an objective measure of fruit flavor to be assessed.

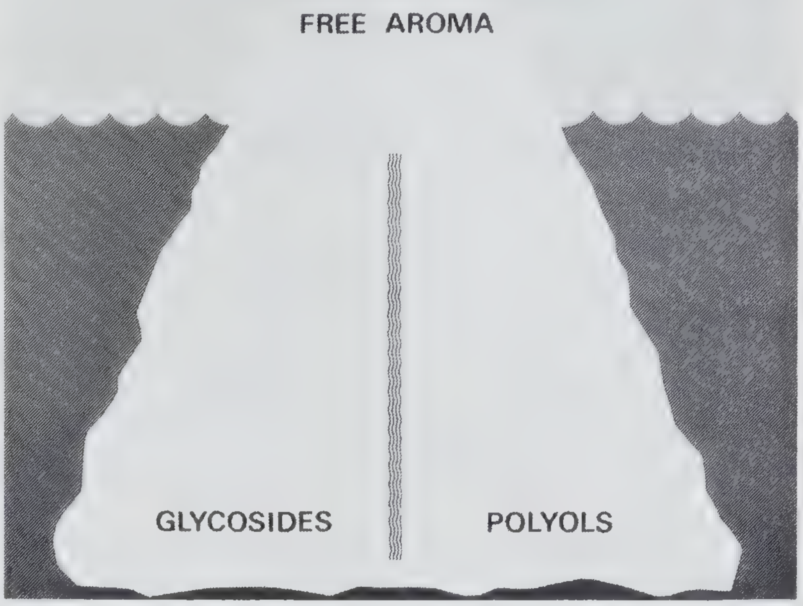

Figure 1—Flavor status of a grape can be depicted as an iceberg with the free aroma compounds as the tip and the surface of the water representing the flavor threshold. Hidden beneath the surface are some 70-80% of the total monoterpenes in the form of flavorless glycosides and polyols.

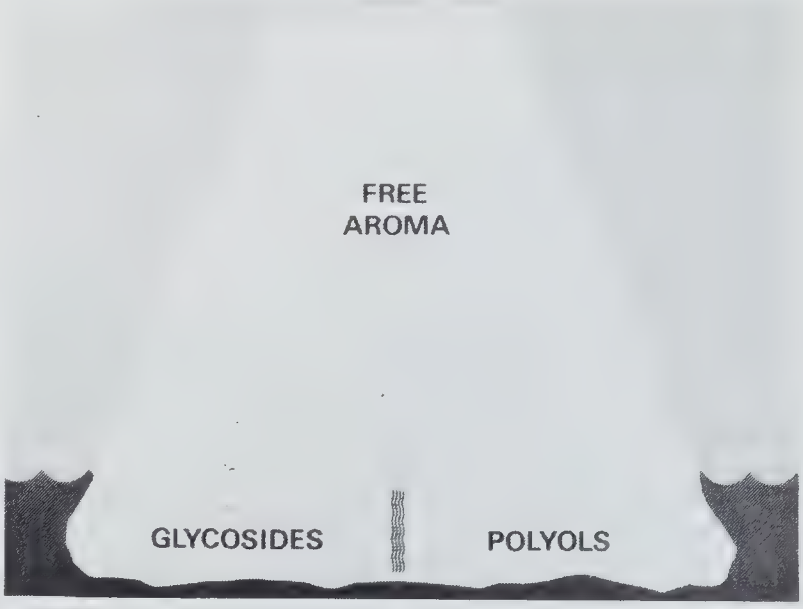

Figure 2—The winemaker's goal is to change the 'flotation' of the monoterpene iceberg by converting as much of the 'submerged' glycosides and polyols to flavorsome free-aroma compounds.

Despite these breakthroughs and recent developments in analytical techniques, there still remains much difficulty for the researcher attempting to isolate and identify trace components from the complex mixtures typical in wines or must. It thus seems highly likely that flavor-based research and technology at the interface of viticulture and enology will branch out along two distinct pathways:

1) *Flavor development and distribution of flavorants within the grape.* Viticultural parameters will be studied on floral varieties through use of a newly developed monoterpene flavor assay

(E. Dimitriadis and P.J. Williams: "Development and use of a rapid analytical technique for estimation of free and potentially volatile monoterpene flavorants of grapes", *Am. J. Enology & Viticulture*, Vol 35, No. 2, pp.66-71). Much valuable data regarding irrigation, pruning, canopy management, harvest time, flavor and flavor potential of the fruit as well as plant breeding information should be obtained.

From a winemaking viewpoint, processing methods for various varieties will alter as more data become available from these investigations and others aimed at finding methods of liberating free volatile monoterpene flavorants from flavorless forms, *i.e.* glycosides and polyols, and from studying the location of individual flavorants within berries of each variety.

Examples of AWRI research programs in this field include the following:

a) In a completed study, development of free monoterpene flavorants and precursor compounds in ripening Muscat Gordo Blanco grapes was monitored. The work demonstrated the extent to which the grapes accumulated flavorants and showed that both free monoterpenes and flavorless precursors continued to increase in grapes for a period of weeks after sugar and acid levels had stabilized. A greater concentration of the total monoterpenes in the juice after veraison were flavorless glycosides and polyols than free aroma compounds. This clearly indicated that juice processing techniques, such as pH adjustment and heating to hydrolyse these flavorless forms, are required to realize the full flavor potential in grape juice.

b) Distribution of various monoterpene flavorants within the skins, pulp and juice of fruit from the cultivars Traminer, White Frontignac and Muscat Gordo Blanco was investigated in an effort to determine whether analytical differences between varieties could be applied to practical winemaking.

This work demonstrated the complexity of monoterpene distribution in different varieties as well as the need to consider all forms of monoterpenes when assessing the consequences of localization in the berry. From the results, the long-held view that aroma substances of the grape are concentrated largely in the skins must be qualified.

High concentrations of free linalool and potential flavorants in muscat juices highlight the value of processes other than skin contact for aroma enhancement of these varieties, while for Traminer the reverse appears to hold.

Of the three varieties studied, the two muscats showed similar monoterpene patterns with a greater concentration overall of these compounds than had the Traminer. The last variety, which was deficient in linalool and higher oxidation-state monoterpenes, had free nerol and geraniol as its major monoterpene flavorants and these were located most abundantly in the skins.

c) An experiment designed to determine the influences on individual flavorants of fruit exposed to sunlight has been undertaken in collaboration with researchers within the South Australian Dept. of Agriculture. It is hoped that this work (still in progress) will give some insight into mechanisms of monoterpene formation as well as point to benefits of certain trellis designs.

2) Further Challenges: Flavorants in non-aromatic cultivars.

In less floral varieties where flavor is more subtle, the relative contribution of monoterpenes to flavor will be less than the contribution made by other compounds. For floral varieties, concentrations of 2-6 mg/L total monoterpenes are commonly encountered. In less aromatic varieties, the components important to flavor are present in considerably lower concentrations than those quoted above.

Chemical research on these delicately perfumed and highly prestigious varieties will be undertaken and this should provide a better understanding of the flavorants involved.

In addition to the characterizing features of monoterpenes, there is growing evidence that certain individual varietal flavors of particular grape cultivars, as well as aspects of wine flavor and bottle ageing, are influenced by the presence in the grape of another group of terpenoids. These are C_{13} nor-isoprenoid compounds, some significant members of which are damascenone, vitispirane and 1,1,6-trimethyl-1,2-dihydronaphthalene (TDN).

Our research in this area has involved isolation, structural elucidation, synthesis and investigations into behavior of the flavorants and their precursors. Generally speaking, the situation with C_{13} volatile flavorants is analogous to that of monoterpenes in that the volatiles have glycosidic and polyolic derivatives as precursors in grapes. A number of C_{13}-precursors are present covering a wider range of oxidation states than do monoterpenes in grapes. Relative stabilities of these precursors also are variable and distribution patterns of volatile products are highly dependent upon hydrolytic conditions.

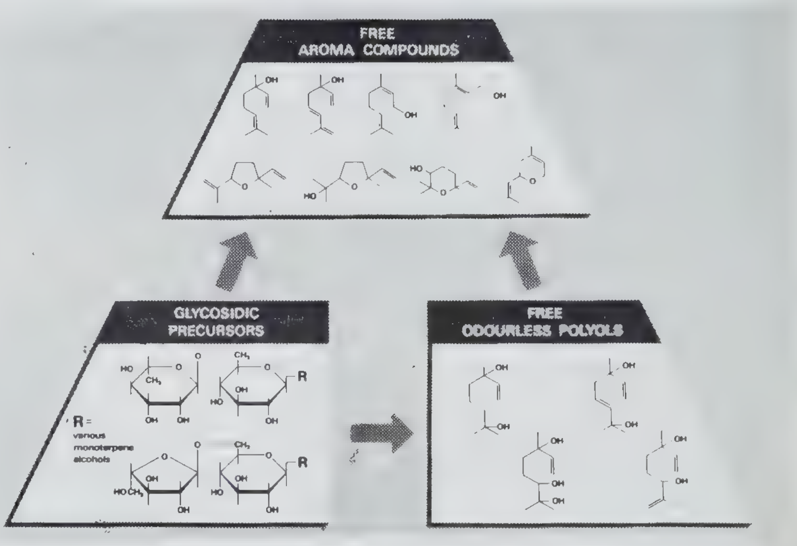

Figure 3—Categories of Monoterpenes in Grapes. Glycosidic precursors and free odorless polyols (at the bottom) make up a reserve of odorless precursors in the fruit. Only the free aroma compounds, (some of which are shown at the top) make any direct contribution to fruit character. Flavor is generated by hydrolysis of either or both the glycosidic compounds and polyols.

By the year 2000—

From research carried out thus far, it is apparent that all grapes have the ability to biosynthesize monoterpene and C13 nor-isoprenoid flavorants. It is also apparent that some cultivars exercise this ability far more than others, but in virtually all cases, similar components are produced. Hence, it is highly likely that varietal differences between cultivars hinge upon relative quantities of the same substances.

By the year 2000, it may be that the triggering mechanisms inducing the grape to produce flavorants will have been established. It may, by then, be possible both to control bottle-aged character in wines through viticultural practices and also to enhance varietal character in fruit by the judicious addition of stimulatory substances applied to the vine during growth. If the latter tantalizing prospect should eventuate, it would mean that vines could be manipulated to produce grapes with varietal characteristics according to the winemaker's flavor specifications.

Less feasible, but nonetheless worthy of speculation, is the proposition that flavor profiles of fruit from unwanted varieties could be altered biologically towards those of varieties more in demand. Such a development would have enormous ramifications within the viticultural and wine industry and would slow down the cyclical process of planting new varieties and then ripping these out or grafting them a few years later.

(Presented at VIEWCON 85, Melbourne, Australia, April 10, 1985.)

Seeding and Maintaining a Good Cover Crop

by Pat Summers

"The characteristics of a good permanent cover crop are that you never, ever, have to reseed it," says Scott Stewart of the Rio Vista, CA, seed-growing firm of J. M. S. Conservaseed. Presently seed from the Stewart firm covers about 2,000 acres of vineyard, and more is being planted each year.

Zorro fescue, a native fescue, is the most popular cover. The low-growing, water thrifty, good reseeder has a fine network of roots that makes it an ideal partner in most vineyards. According to Stewart, the idea that it is normal to to reseed Zorro fescue the second year is a myth. If the first was done properly and the plants maintained correctly, reseeding is continually done by the plant, and not the grower, even that second year.

Planting a cover crop properly requires almost as much planning as planting the vineyard. A cover crop is not something that just happens; it is a second crop that must be planned for, prepared for, maintained, mowed and allowed to reseed.

The planning stages are very important. If the cover is to be incorporated into an existing vineyard it should not follow a regime of soil sterilants. If soil sterilants are part of the cultural practice they should cease the year before the cover crop goes in. Zorro fescue is especially susceptible to sterilants.

On the other hand, a pre-planting herbicide treatment is valuable. "If you have problem weeds now," says Stewart, "there is no way Zorro fescue will eliminate these problems. If you have a dense population of any undesirable weeds, if you have been letting them reseed by disking after the plant reseeds, then you are in trouble. The year before you plan to put in the cover, mow or disc the unwanted weeds after they have committed themselves, when the seed heads are formed, but not yet mature. Mow as low as you can. Try to cut the broad leaf weeds below the lowest leaf so they will not regrow.

"If you are going to use a herbicide, make sure you understand when the plant (the one you want to get rid of) will naturally refruit. Herbicides, especially Roundup, are most effective when the plant is in the reproductive stage, when it is flowering. That is when it is really pulling up sap, and the phloem and xylem are pumping up and down and getting water and nutrients from the roots and bringing energy in the form of sugars back down. That is when herbicides work most effectively. Properly prepared in the spring, the cover crop can be planted the following fall."

In New Vineyards

Planning a new vineyard entails a number of steps, and when done properly it more surely establishes the cover. A permanent cover like Zorro fescue should not be put in too soon. "A vineyard should be structurally complete before you plant a permanent cover crop," notes Stewart. "A cover crop is going to be there for years and years. If you ever have to disk it up and take it out so you can restructure your vineyard, what you have done is spent a lot of money for nothing."

Smooth and level terraces are much more important when you are mowing than they are when disking, according to Stewart. "Take the big dips and valleys out to make sure you don't bottom out your mowing machine. Take out the big rocks that will be slung by your mowing machine, and be sure that the ground is not so rough your machines can't operate. The smooth surface will also improve the effectiveness of any spraying."

While the vineyard is being structured, a temporary cover crop should be in place. This will have to be reseeded each year the vineyard is under construction. There are several possibilities for this, but least favorable according to Stewart is the old popular rye grass. "It tends to re-infest the area throughout the life of the vineyard", making a problem for the permanent crop. According to a pamphlet Stewart has put together for Conservaseed, "Rye grass residues are aeolotropic and may act as a soil sterilant, preventing permanent covers from performing optimumly." Recommended temporary covers are Blando brome, Briggs barley and even common barley.

Stewart advises soil testing. Any cover will need all of the three important nutrients, nitrogen, phosphorus, and potassium for growth, elongation, and reproduction. Nitrogen is the nutrient added most often. To assess need, samples should be taken from the first six inches of soil, but they should be a representative sampling of the vineyard. If the leveling process has moved much soil, then care should be taken that the sampling should reflect the different areas. When necessary, only enough nitrogen to fulfill needs of the cover should be added.

Seed beds must be properly prepared. As Stewart's experience reflects, "It is directly proportional to your final success. You want the seed lying down, covered with ¼ inch of soil particles, rather than clods or rocks or organic matter. Good soil seed contact is very important. Zorro fescue has a very small germ; therefore it can't penetrate much soil. You should not incorporate it too deeply. If you have a very rough seed bed, where the seed can fall very deep between clods or cuts, when it rains the clods melt over the seed, this very small germ with little stored energy can't push to the surface.

"Any hard spot such as cuts, grades, or compacted areas should be worked up so you can obtain good seed contact, with the seed very close to the surface. The first year you are only planting 10 to 12 lbs/acre; in subsequent years the plants will reseed at the rate of about 300 lbs/acre.

"The barleys and Blando brome have much larger seeds. With larger germs, they have more storage capacity. These seeds swell and tend to break the ground. You can get these ½ inch or ¾ inch under the soil, . . . barley can be 1.5 inches deep and will still push through because there is so much energy stored in the seed itself."

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It tends to bridge-over in most seed drills. Some growers have added rice hulls to improve the flow of seeds. This has been moderately successful. Others have given up and resorted to hand broadcasting. Stewart does not disapprove of hand broadcasting; he believes in fact, vineyards under 10 acres are probably most economically done that way.

The Stewarts have purchased a Truax Native Seed Drill for their custom seeding work. They removed the disc openers and replaced them with a series of baffle plates. The augers in the seed box do well with the fescue seeds, as well as more easily handled seeds. "The agitation augers the seed from side to side, and back and forth," describes Stewart. "The seed is fluffed up and floats back and forth across the picker wheels, avoiding any bridging that causes skips in the plantings. Picker wheels grab hold of seed and deliver it down into the seed tubes which is important to uniformity.

"This drill was designed for no-till seedings in the midwest. It had disk openers that needed to be modified. It was made to plant eight-inch rows. Modified by the Stewarts, it now plants six-foot-wide strips and needs only eight-foot clearance between rows."

Zorro fescue at maximum spring growth at Beringer's Knight's Valley vineyard.

Maintenance is also part of the business of having a cover crop and it actually starts before the crop is in. "It is important to take a look at what you have presently and determine what you want to have," Stewart continues. "If you don't understand the botanics of the plant you have vs. the plant you want, you are going to run into trouble, because you won't know what to do to encourage one and defeat the other."

Zorro Fescue matures in time to seed about mid- to late-May. It is usually the first of the annual grasses to mature. As soon as the seed head is mature it should be mowed, thus sewing the seed for the following year. The seeds of the fescue are so fine they do not seem to attract rodents as might the larger seeded barleys and brome. The fescue is such a low-growing plant that it does not appear to provide a habitat for these creatures either.

Color - Color - Color

Jim and Scott Stewart inspect mowed ground cover at Beringer's Lemmon-Chabot Ranch in Napa Valley, CA.

Though erosion is the most often named reason for planting a cover, it is certainly not the only reason. A well-established cover will reduce the impact of the vehicles that must travel the vineyard. Properly chosen plants can also draw water from wetter portions of the vineyard. Even beautification can be a reason for choosing a cover.

Working with large vineyards, the Stewarts became aware that covering the ground is not the only reason for a cover. For some, esthetics need also be served. They are working on seed mixes that can provide color all year long. "We keep the the rows and the traffic areas very utilitarian with something that endures traffic well, like Zorro fescue," adds Stewart. "It is the bench face and the perimeters we are planting to flowers."

A hillside vineyard, especially when viewed from below, gives the impression of being covered with color, when in fact it is only the face of the cuts that have been planted with flowers. Stewart describes a vineyard that changes with the season from an intense hue of Crimson clover to bright blue lupines, to a vibrant orange of California poppies, and into the delicate pink masses of tiny strawberry clover blossoms. Stewart is investigating further additions of African blossoms to carry the flowering on past August's strawberry clover.

The wine business, it is well known, is very competitive. A trip to the vineyard used to be exciting for the visitor. Now competitive marketing may include those who can have the most beautiful vineyard for visitors. Call it 'guilding the lily', but it looks like it might be another facet of competition.

Can one winery take a group of wine writers to a dusty dull vineyard to look only at grapes, when another offers them a sip in a vineyard awash in a blaze of color? Think of the impression on the stockholders when they trip lightly through the blossoms instead of dragging their expensive Italian loafers in the dust of the 'ordinary' vineyard. Maybe even the zoning people will be favorably impressed by such beauty? Need to sell your grapes or maybe your vineyard itself? The brush strokes of flowers outlining the vines should give the impression that all vine management is in good hands.

Summary

Cover crops remain a serious consideration for vineyard managers. To retain the soil, to allow the best penetration of water, to slow compaction—these are all important considerations and should not be lost in the latest idea of flowers, even if it does look like it is going to be a lot of fun.

Weed Control Simplified

by Mike Marcley

"It looks like you've got a lot of weeds out here," says a winery grower relations representative as a grower shows his crop. Sure, there are a few weeds here and there, but only in some areas of certain blocks. If only the pre-emergent herbicides were effective against filaree (*Erodium spp.*), red sorrel (*Rumex spp.*) and cheeseweed (*Malva parviflora*), all the vine rows would be clean.

That was the picture prior to 1982 when Rohm and Haas Company introduced their new herbicide, Goal, containing 19.4% active ingredient of Oxyfluorfen [2-chloro-1-(3-ethoxy-4-nitrophenoxyl) -4(trifluoromethyl) benzene] and 80.6% inert ingredients. It was formulated to be both a pre- and post-emergent herbicide and was effective against filaree, cheeseweed (malva) and other broadleaves if applied at the recommended rate at the proper time. (There are 1.6 lbs of active ingredient/gal of Goal. The recommended rate of 5 qts is actually 2 lbs of active ingredient/sprayed acre). 5 qts/sprayed acre is the only labeled rate for residual control according to Rohm & Haas.

After doing trials in 1982, Dennis Murphy, vineyard manager at Murphy Ranch in Alexander Valley outside Healdsburg, CA, decided to incorporate Goal into his herbicide program. "I used it as a supplement to 'heat up' my regular tank mix in 1983; that is, to make it more potent, and thereby I hope to control filaree, dock and cheeseweed.

"I ran some 4 and 5 quart/acre test blocks and finally decided to use Goal at 4 qts/acre over the entire ranch in 1984. This is lower than the 5 qt/acre recommended rate for maximum residual effectiveness, but we don't use overhead sprinklers anymore. I didn't feel the need for the extra expense (above $60/gal) for herbicide protection into the growing season."

Murphy skirts or cane-cuts his vines to 20 inches above ground to enhance air circulation under the canopy during the growing season. This makes early (October-November) herbicide application before pruning possible. (The herbicide wand requires a 16-inch vertical clearance.)

Murphy reports that with his new tank mix of 4 qts Goal, 1 qt Paraquat and 1 lb Simazine in 60-100 gal water/acre (depending on weed height and expected rains), he hasn't had to send people back into the vineyard for weed control. He substitutes Roundup at 1 qt/acre for Paraquat in areas where bermuda grass is a problem. He has had no filaree, mustard or dock problems in areas where this mix has been used. He'll use even less Goal (2.75 qts/acre) in trial areas that have received the herbicide at 4 qts/acre for the past two years.

"After two years at 4 qts/sprayed acre," explains Murphy, "the berms look so good that I'll try the lower rate (2.75 qts/sprayed acre) for both knockdown and residual control. I believe that the weed seed population has been reduced enough for this lower rate to give effective control."

Mike Neal, vineyard manager of Napa Valley Vineyard Co., used Goal on 1,800 acres in 1984 and noted that it made his job a lot easier as he manages 35 different properties ranging in size from 5 to 700 acres. "A lot of vineyards had cheeseweed, filaree and mustards. They could be a real bear to manage," says Neal, "but after using Goal these vineyards have been pretty well weed-free." Neal knows that without Goal he would have to send people back into the vineyards in spring to hoe the cheeseweed and filaree. "There isn't enough time in spring for this or mechanical hoeing to remove weeds," he added.

At a cost of $18-$30/sprayed acre (covering 3-foot wide strips under vines) utilizing a tank mix of 5 qts Goal, Simazine or Karmex pre-emergent and Roundup or paraquat as contact

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will reduce hoeing in the spring. This type of tank mix can ensure us of durability and longevity against any new weeds germinating in early summer. Similarly, both operators and equipment are freed for other vineyard operations such as cultivating and insecticide and fungicide application. The cost of repairing trellis systems and replacing vines which at times result from the hoe-plow is eliminated.

Neal added that it is possible to reduce the rate of Goal application after using it at the full 5 qt/sprayed acre rate for two years, thus reducing the cost by $15/acre of vines. "In 1984 I used Goal at 2.75 pts/sprayed acre on 400 acres and it worked fine for both knockdown and pre-emergent weed control. Goal 1.6E is a safe herbicide applied without injury to the vines as long as the label instructions are followed."

Neal points out that the present limitation to using Goal is its limited application time: from October 1 to February 15. "In some wet years it's not possible to get over all your ground in the short amount of time. Since budburst may not occur until early March in the North Coast counties, it would make things easier for us if the application time could be extended until March 1."

Hughes Ryan, vineyard manager at River Oaks Vineyards in Healdsburg, has filaree and cheeseweed problems on nearly 250 of his 500 acres. Roundup at 1 qt and Simazine at 4 lbs/sprayed acre constituted his herbicide program until 1983 when he began using Goal at 2.7 qts/acre for his problem vineyards.

"We get good control of both filaree and malva with the mix of Roundup and Goal which costs about $20/vineyard acre," explains Ryan. "The Goal costs about $8-$9/vineyard acre. Filaree and malva begin to come up with the November rains (after harvest). This is probably the best time to control them with herbicides." However, Ryan prefers to start herbicide application after pruning in January because he doesn't hedge or skirt his vines. He has no trouble covering 500 acres (about 165 sprayed acres of ground) in 4-6 weeks.

Ken Weber, Central Coast manager of vineyard operations and grower relations for the Seagrams Wine Company, reports Cheeseweed to be the main weed problem in their 1,800 acres in Soledad and Greenfield. Prior to 1983, when Goal was registered for use in vines, his herbicide program had been built around Simazine and other residual/contact herbicides but wasn't controlling cheeseweed.

"It comes up in early November after harvest," says Weber, "but we don't apply herbicides until December through January after the pruners have finished. We use a mix of 4 qts Goal and 1 qt Roundup/sprayed acre in all vineyards with mature vines where cheeseweed is a problem. Morning glory is still a problem so we have to go back into the vineyards in spring (early May) to spot-spray with Roundup at 1 qt/sprayed acre."

Weber feels that he gets better coverage and effectiveness of chemical when it is applied after pruning when the vineyard berm is relatively clean and maximum spray coverage is obtained. "I think the Goal-Roundup combination is the best I've seen for vineyards," concludes Weber. "It's effective on all our soils here and has eliminated our cheeseweed problem."

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Méthode Champenoise, Part III: Pressurage

by Bruce Zoecklein, Enologist—Department of Horticulture
Virginia Polytechnical Institute, Blacksburg, Virginia

"One day he called 'em all together,
And one by one, he asked 'em whether
It were not better by good diet
To keep the blood and humours quiet,
With toast and ale to cool their brains
Than nightly fire 'em with Champaigns."
Sir Charles Sedley—The Doctor and The Patient

According to Renvoise (1983), méthode champenoise should have a pleasant, fruity aroma, the fragrance of flowers accompanied by 'le goût champenois' or bouquet due to time spent 'sur lies'.

The review of grape aroma components by Strauss et al. on page suggests some interesting avenues of further investigation regarding the relationships between potential and free-aroma components. Production parameters have a major effect on the extraction and retention of aromatic components from the grape, overall style and palatability of sparkling wines. This begins a discussion on méthode champenoise processing considerations.

The majority of méthode champenoise producers follow the traditional practice of pressing whole grapes. This is the result of the fact that the chemical constituents of the grape are not uniformly distributed within the grape berry. There are essentially three juice zones within the grape: the juice from pulp between the seeds and skins, the pulp near the skin, and juice from the pulp surrounding the seeds. The area halfway between the skins and the seeds yields the initial juice extracted which is rich in both acid and sugar and low in phenols and varietal flavor constituents.

Table I shows the chemistry of various juice fractions extracted by pressing whole Chardonnay grapes in Champagne.

Each press fraction differs in titratable acidity, tartrate/malate ratio, pH, phenols, sugar content, flavor constituents, yeast titer, and color.

Most producers of méthode champenoise are looking for a delicate aroma in their cuvées which is associated with the initial juice—the *vin de cuvee*. Indeed, the prestige cuvee or *tête de cuvée* of most producers is made from the finest cuvees, generally from the juice of the first and most gentle pressing.

Later press fractions, *vin de taille*, often possess the undesirable attributes of high pH, low titratable acidity, excessive color, high phenol content and a high level of non-soluble solids. *Vin de taille* can make perfectly agreeable sparkling wine; however, it is fruitier, less fresh and less elegant than the *vin de cuvée*. The elevated pH, reduced acidity and higher phenol content may limit its ageing potential. *Vin de taille* is often made into extra dry, sec or demi sec rather than brut. Juice of the final pressing or *vin de rebêche* is often lacking in acid, somewhat bitter and may have considerable color.

In the USA, it is common to segregate at least several pressings. Table II shows three press fractions of California Pinot noir.

Table I
COMPOSITION OF MUST AND RESULTING WINE OF EIGHT SUCCESSIVE FRACTIONS
(From same grapes in a champagne basket press - 4000 Kg)

		Press no.	Amount (1)	Sugar (g/100cc must)	Titratable acidity (g tar./100cc must)	pH Must	Tartaric acid Must (g/100cc)	Potassium acid tartrate Must (g KH ta/100cc)
Vin de cuvée	première cuvée	1	200	19.3	0.79	2.98	0.612	0.471
		2	220	19.2	0.85	2.94	0.7 28	0.575
		3	600	19.3	0.96	2.87	0.810	0.598
	deuxième cuvée	4	600	19.1	0.93	2.94	0.777	0.650
	troisième cuvée	5	400	19.3	0.82	2.96	0.687	0.678
Vin de taille	première taille	6	400	19.2	0.66	3.12	0.517	0.603
	deuxième taille	7	2.70	19.1	0.51	3.43	0.410	0.655
	troisième taille	8	2.00	18.3	0.45	3.69	0.349	0.874

Source of data: Francot (1950).

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Table II
CALIFORNIA PINOT NOIR PRESS FRACTIONS*

Press Fractions	Total Phenols mg/1 GAE	T.A. g/100ml	pH	AB 520NM	Yield gal/ton
1	200	1.3	2.8-3.1	.25	110
2	250	1.10	3.1-3.25	.62	20
3	320	.95	3.30-3.45	1.10	7

* *Data averaged from several sources*

Separation of several juice fractions during pressing is often determined by taste. As noted in Table II, there is a drop in the titratable acidity following the extraction of 110-120 gal/ton, depending upon the grape cultivar, maturity and growing conditions. For example, Chardonnay grapes always give a greater juice yield than Pinot noir, due to the fact that they contain more pulp. Tasting the juice during the pressing operation allows for segregation of press fractions. Separation of press cuts can also be done by a simple screening test of phenols and by color (Schandrel 1962).

In Champagne, only the first 2,666L (705 gal) extracted from a *marc* (4,000 kgs or a little more than 8,800 lbs) has the right to the appellation. In the USA such restrictions do not apply. However, at least several press fractions are taken, fermented and often aged separately. Some of the later press fractions may be blended with the primary fractions as a result of economic and/or organoleptic considerations.

To avoid extraction of excessive aroma and phenols from the skins, care must be employed in grape handling. Many producers carefully hand harvest into containers (30-1,000 lb boxes or bins) to help avoid berry breakage. At least one large producer of méthode champenoise mechanically harvests at night. Although mechanical harvesting increases the potential for juicing, this allows a large crop to be harvested quickly at the optimum level of maturity. The goal is to deliver cool grapes, weigh them and load the press as quickly as possible with the least possible juicing.

Care must be used in loading the press. Conveyors and delivery systems which break berries prior to pressing are considered undesirable. The lack of skin contact, especially in heavily-flavored varieties, produces a more elegant, less varietally dominated cuvée. The sparkling winemaker should never lose sight of the effect carbonization has on perception of wine character. The sparkle adds a significant magnifying effect on the odor components of a wine. One California sparkling wine producer uses a vacuum system capable of moving 20 tons/hour of whole grapes into the press. This helps avoid berry breakage and reduce the extraction of phenols by 100 mg/L G.A.E. (*PW*, Vol.IV:1, pp.18-19).

Separation of the stems need not occur before pressing. The stems help insure efficient and improved draining and allow pressing of whole grapes at lower pressures. Ultimately, this aids in obtaining a lighter, more delicate first-cut press juice fraction. Care must be taken to insure that stem breakage does not occur due to the possible extraction of bitter phenols into the juice.

The trend in the sparkling wine industry is to employ membrane presses, champagne ram presses or traditional basket presses. The champagne basket press or cocquard is still used by some houses in Europe. This unit is unique in that it has a very shallow *maie* or press basket, rarely over two feet deep with a diameter of 10 feet. The shallowness of the base relative to its width allows for grapes to be spread out in a fairly thin layer which reduces skin contact with the juice as it flows through the crushed mass of grapes. Thus, less press pressure is required.

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Table III

Cultivar	Sugar Content g/Kg	Titratable Acid g/l	pH	Catechin mg/l	Leucoanthocyanin mg/l
Trebbiano					
Belt Press	142.50	9.87	3.10	8	25
Basket Press	148.20	9.82	3.10	36	74
Pinot					
Belt Press	168.30	10.60	3.10	128	11
Basket Press	168.30	10.70	3.10	140	39

Source: Ottinia and Panetto 1981

Retroussage or breaking-up of the cake must occur several times so that the grapes are redistributed toward the center of the *maie* where the pressure of the *mouton* or press plate is greatest. Membrane presses and serpentine or belt-type presses obtain thin layer extraction by more gentle pressing with the added advantage of speed and efficiency.

Table III compares several important parameters of a thin layer belt press vs a traditional basket press.

White wines with a total phenol content of 200 mg/L G.A.E. can expect to have approximately the following constituents (Singleton 1985):

100 mg/L non flavonoid caffeoyl tartrate and related cinnamates

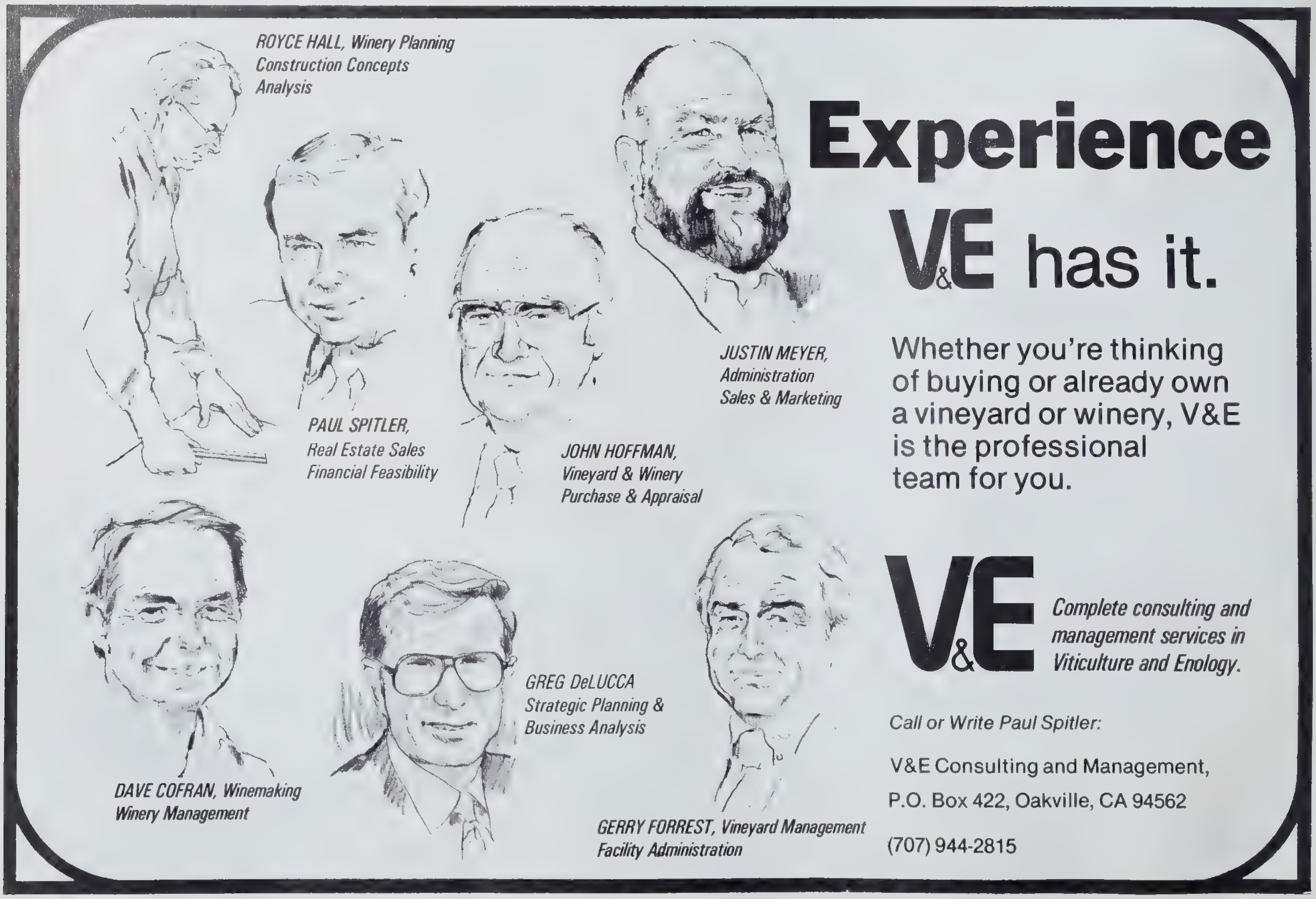
30 mg/L non flavonoid tyrosol and small derivatives

50 mg/L flavonoids—especially catechins and flavon polymers (tannins)

mg/L SO_2 and other interferences

The level of total phenols and types of phenols present is a function of the design of press, and press pressures among other factors. The nonflavonoid fraction is relatively constant in the initial pressing of white and red grapes because these compounds are present mainly in the easily extracted juice. The nonflavonoid fraction of cuvées not exposed to wood cooperage totals about the same as from the juice it made. There is, however, considerable modification and some may be lost or gained with ageing (Singleton 1980). Most nonflavonoid phenols are individually present below their sensory threshold. The additive effects are believed to contribute to bitterness and spiciness.

Flavonoids such as catechins are extracted from the skins with increased press pressure and may vary with the type of press employed (see Table III). Catechins account for most of the flavor in short skin contact white wines. *Vin de cuvées* (first press cuts) produced by low press pressures and thin layer pressing can be low in total phenols and particularly in flavonoid phenols resulting in a low extract. This is an important production consideration.



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Méthode champenoise has a flavor profile which contains three major stimuli: 1) the tactile base influenced by the extract and astringent elements, 2) the acid perception which is influenced by acid content, cations, buffering capacity, sugar and alcohol, 3) and the sugar taste which is produced mainly by the alcohol and sugar. In bruts especially, finesse must be in balance with liveliness and the body of the wine. An extract of approximately 25 g/L gives body without heaviness (Schopfer 1981). Moderate pressures or combining portions of later press fractions are methods of stylistic input that can affect among other things, the tactile base and the aromatic character of the cuvee.

Unlike traditional basket presses, membrane presses give more complete control over the pressing operation, higher yields, produce less non-soluble solids and require lower press pressures to obtain comparable yields. Low press pressures aid in minimizing color extraction and the chance of macerating the stems which would release bitter phenols into juice. A membrane press can press to dryness at two atmospheres while many ram-type presses require 10 atmospheres pressure to reach dryness.

There are méthode champenoise producers who do not press whole grapes but simply crush and drain. There is yield and efficiency reduction by pressing the fruit rather than crushing and draining. For example, a membrane press that is rated for a charge of 20 tons will hold about 12 tons of whole clusters. Crushing rather than pressing whole grapes mixes the three fractions shown in Table III and can result in increased extraction of 100 mg/l phenols G.A.E. or more depending upon the cultivar, degree of maceration and fruit temperature. 100 mg/l is approximately the sensory threshold for phenols in a white wine (Singleton and Noble 1976).

Sulfur dioxide is often added to the juice expelled from the press rather than directly into the press to avoid extraction of color and non-colored phenols. Although it is considered desirable to use SO_2 to prevent browning due to oxidases, there is certainly no industry consensus regarding optimum amounts. In the USA, often around 50 mg/L is added to the first cut press fraction although such a decision must be made based upon the juice chemistry, temperature, malolactic fermentation desires, etc.

Phenols are oxidized in the absence of sulfur dioxide and therefore some pass from the colorless to the colored or brown form. Less soluble or insoluble tannins (phenols with a molecular weight of 500-3,000 etc.) precipitate and may be removed during fermentation due to the absorbant capacity of yeast. Müller-Spath (1981) suggests the desirability of low sulfur dioxide additions (20-25 mg/l) to the juice under the right microbiological and temperature conditions to encourage some oxidation.

Cloudy juice contains nitrogenous substances which are positively charged which can help bind and precipitate negatively-charged tannins, particularly if some limited oxidation has occurred. He points to greater cuvée stability with respect to further oxidation as a major advantage. The addition of SO_2 to the juice prior to fermentation can lead to H_2S formation as well as undesirable secondary byproducts. Moreover, even the formation of SO_2 from sulfates seems to be lower if the must has been sulfited sparingly (Müller-Spath 1981).

Singleton et al. (1980) showed that oxygenation of must for white table wine production may increase resistance to further browning however resulted in wines which were judged to be less fruity. Although one must be concerned about the degradative effects of oxidation, the reduction or elimination of SO_2 may be a cuvée production consideration which warrants further review.

More to follow.

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Pierce's Disease Reappears in Sonoma County

by Mike Marcley

Recurrence of Pierce's Disease (PD) in Sonoma County, CA, has both local vineyardists and extension entomologists concerned. "It was present in the Dry Creek Valley and was a major problem in the Napa Valley in 1964. Research at that time identified problem areas, enabled control measures to be implemented and prevented the disease from spreading," says John Joos, Extension Entomologist for Sonoma County.

"We have found it in several areas including Frei Brothers, Preston Vineyards and David Paulsen's vineyard in Dry Creek Valley." In addition, two other locations of major importance have been confirmed as having Pierce's Disease by Joos. They are Gary Mills and Sciani in upper Alexander Valley. These vineyards are undergoing research trials by Joos and his associates. In all cases, the disease is following its typical pattern of spreading into vineyards next to rivers or areas which support host plants (blackberry, wild grape, elderberry, mugwort, buckeye and willow) that harbor *Graphocephala atropunctata*, or blue-green sharpshooter, the most important insect vector of Pierce's Disease in north coast counties.

"These insects overwinter on this natural vegetation, which also is affected by PD, but they do not transmit the disease until they move into vineyards in the spring. Yellow sticky traps (any bright yellow surface coated with Stikem from Seabright Enterprises, Emeryville, CA) are the only method we have of measuring insect distribution and eight feet is the highest we presently have measured movement.

"If insects are caught up in prevailing winds and blown off the tops of the ridges (more than 100 feet above the adjacent Frei Brothers Vineyards), the disease may spread more rapidly than in flatter areas (*e.g.* near the Napa River where the inoculum sources are at the same level or below adjacent vineyards).

Table 1

The effect of PD on 50 acres of vines along Dry Creek at Preston Vineyards

Block	1983	1984	Projected Total
Barbera	7 pulled	56 marked (5)	68
Muscat	206 pulled	346 marked (300)	852
French Colombard	700 pulled	570 marked (250)	1520
Semillon	400 pulled	109 marked	509
Sauvignon Blanc Young	60 pulled	188 marked (200)	448
Sauvignon Blanc Metal	80 pulled	482 marked (500)	1062
Sauvignon Blanc Wood	36 pulled	419 marked (400)	855
Chenin Blanc		118 marked	118
Semillon Pena Cr.		13 marked	13
Cabernet Franc		13 marked	13
			5458*

* *This represents about 12 acres or nearly 25% of the 50 acre vineyard.*

"I've proposed a study which includes use of sticky traps suspended from balloons next to these ridges so we can more accurately determine insect dispersal and potential disease spread. If we can get the necessary funding, we'll be able to see what effect wind and elevation have on sharpshooter movement."

Knowledge of insect dispersal is very important because the only way of controlling PD is to prevent insects from entering vineyards in the spring, according to Joos and Dr. Sandy Purcell, Associate Professor of Entomology at University of California, Berkeley, whose Ph.D. thesis covered blue-green sharpshooters in relation to epidemiology of PD.

"If sharpshooters are infective (if they contain the PD bacterium), there is better than a 90% chance they will spread the disease to plants they are feeding on," Purcell explained. He found that from 10-30% of sharpshooters collected from diseased vines or adjacent native vegetation are infective. This means that if there are only ten sharpshooters on an entire vine, at least one of them is probably infective and there is a 90% chance that it will transmit PD to that vine.

All viniferas are susceptible to PD, but varieties differ in their susceptibility. For example, Flora, French Colombard, Chardonnay, Pinot Noir and Barbera are very susceptible. Chenin Blanc and Cabernet Sauvignon are moderately susceptible. Zinfandel appears almost resistant because it takes so long (15-20 years) for PD to kill these vines. For example, Joos has seen one hillside vineyard of Zinfandel completely destroyed by PD in thirty years in the Dry Creek area.

Preventing spread of blue-green sharpshooters is accomplished either by spraying overwintering host plants to kill the insects before they move into vineyards or by removing these host plants so there is no inoculum source for spring infection. California Fish and Game regulations do not permit spraying toxic organophosphate insecticides (*e.g.* Cygon) within 200 feet of rivers and streams because of the adverse effects to fish and wildlife. Host plant removal from these areas and subsequent replacement with non-host plants, like conifers, to hold soil in place is necessary in these situations, according to Joos.

Cygon and Sevin are chemicals commonly used to control bluegreen sharpshooters. Unfortunately, they also kill *Anagris epos* (Girault), the parasite which effectively controls grape leafhopper. "Blue-green sharpshooters are not very dispersive insects. That is, they don't appear to move around much in vineyards," says Purcell. "In fact, they will only fly about 100-200 feet over ground where no vines are planted. Similarly, the highest incidence of PD and the vines most severely affected by the disease occur nearest to the insect's overwintering habitat.

"This same pattern occurs repeatedly in PD areas of the Napa Valley. Vine rows adjacent to the river have been replanted and wiped out by PD several times while in the same vineyard, 100-year-old vines 300-400 feet from the Napa River (the overwintering habitat for blue-green sharpshooters) are still producing grapes.

"Blue-green sharpshooters appear throughout these vine-

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yards by late summer (August), but PD is most severe in areas within 150-200 feet of the river. It is apparently spread mainly by young adult sharpshooters which are active in the spring."

Controlling the spread of PD is centered around identification and removal of overwintering habitats, killing sharpshooters in these areas before they move into vineyards, and knowledge of the insect's dispersal from overwintering sites into vineyards. Purcell has studied PD spread related to sharpshooter dispersal in the Central Valley (from southern Tulare County to northern Fresno County) and has found that it spreads from west to east, the direction of prevailing winds.

"The sharpshooter flies at dusk, prevailing winds in the southern Central Valley at dusk are out of the west, and so spread of PD is mainly from west to east. In the 14 cases we closely examined, the pattern was repeated. Where there was vineyards on all sides of old alfalfa fields, (alfalfa is a carrier of the PD bacterium which also causes alfalfa dwarf, and is a major overwintering site for both *Draeculacephala minerva* (green sharpshooter) and *Carneocephala fulgida* (red-headed sharpshooter), important vectors of PD in this warm region), PD only spread into vineyards on the eastern side of the alfalfa. There was no significant spread into vineyards on the north, south or west of old alfalfa fields."

Purcell related that blue-green sharpshooters were rare in the southern Central Valley, but that both green and red-headed sharpshooters were abundant. These latter two feed on grasses and alfalfa but have been found on vines.

"Grapes are accidental hosts. When sharpshooters fly at dusk and there is a little wind (there doesn't have to be

---

Answers to technology quiz, page 11:

1) chainsaw
2) forklift
3) transistor
4) latex basing
5) genetically engineered tomato (tough skin) or machine harvesting
6) gas turbine engine
7) cargo container
8) white Zinfandel
9) the computer

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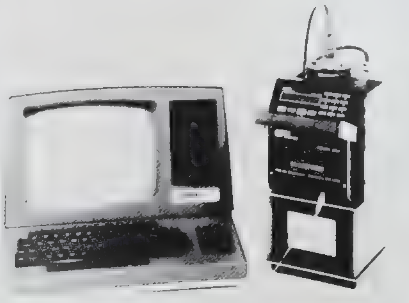

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much) which blows them onto vines, they may make a couple of foraging flights in search of preferred food before deciding there is nothing but grapes and settle down to eat because they're hungry—and transmit PD."

In Sonoma County, Joos has traced the spread of several insect-transmitted diseases in relation to spread of their insect vectors for the past 16 years. In 1982 he added PD to the list and began recording occurrences and population estimates of blue-green sharpshooters which often appear in traps set out to monitor other insects such as orange tortrix, omnivorous leaf roller and Douglas Fir midge. He currently has a total of 59 yellow sticky traps for the blue-green sharpshooter in the Dry Creek Valley (a potential new hot spot for PD) at both Frei Brothers and Preston Vineyards.

"We have blue-green sharpshooters in every area of the North Coast," said Joos. "Throughout the Hopland area of the Russian River, over on the coast, 16 miles from Yorkville, and up on the Smith River on Blackberry. It's also present in Pope, Alexander and Knight's Valleys. I've seen very high populations of the insect southeast of Middletown in Lake County."

Fortunately, the spread of PD appears to be limited, possibly by climate because overwintering habitats (bermuda, water and fescue grasses, perennial rye, ripgut brome, Black, Himalaya, Elder, Christmas and Snow berries, Willow, California Mugwort, Cocklebur, Coyote bush and Stinging nettle, Buckeye and wild grape), the insect vector and grapevines are found throughout northern California.

Blue-green sharpshooters, the most effective PD vector and the only one that prefers grapes, are confined to the cooler and more humid areas of California, according to Purcell and Joos. "Even though they are found in large numbers throughout these regions, PD has only been confirmed along the Napa River and on Spring Mountain in Napa County and in Dry Creek and Alexander Valley. This does not mean that PD will not be found in or near Sonoma," Joos claimed.

Joos examines low-level yellow sticky trap beside Dry Creek for blue-green sharpshooters (March 23, 1985).

As Joos and I inspected his yellow sticky traps at Frei Brothers Vineyards, he explained that sharpshooters moved into vineyards from overwintering habitats on surrounding ridges. South of the vineyard on a ridge 100 feet above, he found two blue-green sharpshooters on a trap.

"They can potentially be spread for long distances from these ridges because prevailing winds come from either the

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southwest or northwest, right down these canyons planted to grapes," said Joos. "Every sharpshooter caught on a trap represents nearly 50 in the field (natural vegetation or vineyard, depending on trap location)." He doesn't like to see any sharpshooters in traps near vineyards, particularly in the early spring (March-early April).

"The key to controlling PD is to eliminate sharpshooters in the spring before they have a chance to move into vineyards," claimed Joos. "Break that first generation. Bust its back so it can't return. Then we can go into the fall with no problem."

Spraying overwintering habitats with Dimethoate (Cygon) at 25WP at 8 lbs/acre or Carbaryl (Sevin) at 2 lbs/acre is the only way this generation of sharpshooters is being controlled. A combination of spraying and removal of overwintering habitats is being practiced at Preston Vineyards where PD is apparently only moving into vineyards from the adjacent Dry Creek.

"Look at that damn thing," observed Joos, "One, two, three, four . . . PD has wiped out 12 vines in a row. It's moved 120 feet into the vineyard from the river. Preston is cooperating with total brush removal from the river banks and will replant with conifers to stabilize the soil. This satisfies California Fish and Game regulations against spraying within 200 feet of rivers with toxic organophosphates such as Cygon."

One blue-green sharpshooter was found on a sticky trap east of and across the vineyard from Preston's winery. "That one sharpshooter could infect three or four vines. With nearly 30 sharpshooters in the vineyard for every one on a trap, that means nearly ¼ acre of vines is potentially infected with PD right now.

"I am working closely with Frei Brothers, the Prestons, and David Paulsen in Dry Creek and Gary Mills and Sciani in upper Alexander Valley on a research project to show that the further spread of sharpshooters and PD can be prevented. When I find even one of these insects on a trap in early spring, I immediately spray the nearby overwintering habitat with either Dimethoate (Cygon) at 25WP at 8 lbs/acre or Carbaryl (Sevin) 80S at 2 lbs/acre. We picked up a blue-green sharpshooter on a trap on March 12 and I sprayed the blackberry habitat two days later. We didn't pick up any sharpshooters until April 16."

"I've got PD in Muscat, French Colombard, Semillon, less so in the Chenin Blanc and extensive damage throughout the Sauvignon Blanc," says John Clendennen, Preston vineyard manager. "We've got 50 acres along Dry Creek. Eight acres were planted to Cabernet Sauvignon and Merlot in 1974 and then T-budded to Semillon and French Colombard in 1979. The balance was planted to Chenin Blanc and Sauvignon Blanc, also in 1974.

"Dr. Goheen (professor of Plant Pathology at UC Davis) confirmed PD as the cause of dying vines here in 1981. He has been back here once and I've also talked to Purcell twice, talked to John Joos quite a bit, and taken several samples to Keith Bowers (Napa County farm advisor), so I have no doubt about recognizing PD in the vineyard.

"The disease appears to be spreading and we anticipate pulling the equivalent of 12 acres over the next few years, but at present have only removed the equivalent of six acres throughout the 50 acres. (see Table 1) At an average of $600/ton and 5 tons/acre, that represents a lot of lost income. Add nearly $10,000 for vine pulling and replanting plus another $5,000 for brush removal and you can see why we want to keep PD out of this area."

They hope to do this with a combination of brush removal, insect monitoring and spraying, but they can't treat areas on the opposite side of the river and on ridges above their property. If sharpshooters are carried into their vineyards from these areas, PD will continue to be a problem.

Research trials done in the spring of 1985 using spot treatments outside of vineyards on PD hosts have shown a major reduction of blue-green sharpshooters in vineyards as opposed to untreated areas according to Joos.

Joos has proposed a program to prevent the spread of PD and possibly reduce the disease level now present in Sonoma County. This would include:

1) Searching world literature on *Graphocephala atropunctata*, the blue-green sharpshooter.

2) Monitoring the insect's aerial dispersal from hosts adjacent to Frei Brothers and Preston's vineyards by using traps suspended from balloons and at various locations around the vineyards. Also by use of traps on a grid system in ravines, canyons, ridges and other overwintering sites.

3) Monitoring populations of blue-green sharpshooters in specific host plants at various distances from trial vineyards.

4) Timing trials with several insecticides in 'hot spot' situations to prevent insect movement into commercial plantings.

5) Pesticide trials with those known to be effective against blue-green sharpshooters as well as the synthetic pyrethroids such as Pydrin, Pounce, Payoff, and FMC 54800 which have residual activities of up to 60 days.

6) Studying the host range of blue-green sharpshooters along creek and river banks so these can be removed and replaced with non-host species.

7) Recording temperature, humidity, wind direction and velocity at trial vineyards.

8) Performing infrared aerial and follow-up ground surveys to determine incidence of PD in trial areas.

Purcell would also like to know if there are different strains of the PD bacterium because it is found in a wide range of plants including alfalfa, bermuda grass, almond, and blackberry. He would also like to know why the bacterium appears to lose its infectivity when grown in culture and why vines infected later in the growing season recover from the disease during the winter.

Is there an effective natural parasite for this insect? It appears too abundant, even on natural vegetation, to be native to the North Coast region. "For example, if the insect's area of origin was southern Mexico, natural enemies from that region might reduce the sharpshooter to the status of a rare insect," adds Pucell. Answers to these questions may reduce the threat of PD to vineyards near creeks, rivers and ridges which harbor blue-green sharpshooters.

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Burgundian Viticulture: Vine Varieties

by Don Blackburn

The Pinot family of vines has been widely cultivated in eastern France since the Middle Ages. Few families within the species *Vitis vinifera* have drawn so much attention under so many names. To follow its evolution, one must compare diverse references and wrestle with erroneous descriptions of loose bunches and oval berries.

The first known appearance of the term 'Pinot' was in 1375, at a time when the dukes of the House of Valois ruled Burgundy and Flanders, and feuded with the weak kings of France. The dukes of Burgundy already had extensive vineyard holdings south of their capital in Dijon, but they had previously referred to the variety in question as 'Noirien'. Burgundian historians have long been tantalized by the unsubstantiated notion that the duke of that day, the famous Philippe le Hardi, had fathered a new strain of 'Noirien' which he named 'Pinot'. His interest in varietal quality is attested to by his 1395 banning of Gamay from vineyards in his realm, claiming that it was a 'disloyal plant of low quality and high yield'.

Pinot noir has occasionally been called 'Auvernat', or misspelled as 'Pineau', but most often, names such as 'Noir Mênu', 'Petit Noir', or 'Pinot Rougin' referred to specific strains rather than to the variety as a whole.

Before passing to the main strains used in winemaking today, I should note briefly a number of minor Pinots, simply to put the whole into perspective. Pinot Liebault, a strain with a tendency to shatter, was selected in Morey St. Denis in about 1840. Pinot Aigret, or Pinot 'Dru', whose leaves are deeply lobed and a very dark green, is unpopular due to its low yield. Pinot Mouret was formerly used to add color and acidity.

Pinot 'Beurot' is the Burgundian name for Pinot Gris. It was once interplanted with Pinot noir, Pinot blanc, and Chardonnay. Pinot Gris is now grown in Alsace, where growers have identified several types. The traditional form is the 'Tokay à petit grain' (small-berry Pinot Gris), which tends to yield about three tons/acre. This type has been largely replaced by the 'Tokay à gros grain' (large-berry Pinot Gris), whose yields of 4.5 to 7 tons/acre are more in keeping with those common in Alsace. The 'large-berry Pinot Gris' lacks the vinous flavor and full-bodied firmness of its less vigorous forebearer. Some quality-conscious Alsatians have planted a 'Tokay à grain moyen' (moderate berry size), which has intermediate wine quality in Alsace and can be quite satisfactory.

Pinot 'Tête de Nègre' ('Negro Head') has a red juice, so rare in *Vitis vinifera*. Like the other 'tainturier' *viniferas*, its abundance of red pigment is reflected in the reddish tinge of its foliage. The name of this strain is thought to originate in the absence of a 'bloom' on its grape skin. The sunlight thus shines directly on the epidermis's blackish surface, whereas in other grapes it would be intercepted by the waxy cuticle and by the substances and microbes fixed thereto. Pinot 'Tête de Nègre' was included in the official clonal research program mainly because of its deep color. It was denied certification because the study found that the wine it produces is too coarse for existing quality standards.

Pinot Meunier is the most widely planted variety in Champagne, comprising as much as Pinot noir and Chardonnay combined. It results from a spontaneous mutation of Pinot noir. The term 'meunier' is the French word for 'miller'. With a white downy fuzz covering its young shoots, Pinot Meunier looks in the spring as if its shoot tips had been sprinkled with flour. Its value in Champagne is the fertility of its regrowth after spring frost. Its value enologically is inferior to that of Pinot noir, be it for still or for sparkling wine.

Major Phenotypic Variations in Pinot noir

It is common in California to refer to the Martini clone of Pinot noir, for example, or the Martin Ray clone, among others. These terms are both relevant and understandable to other Californians. However, one should leave these terms behind when discussing Pinot noir in Burgundy. This is because only a small portion of Pinot vineyards in Côte d'Or have been planted with clones bearing a particular name. Although clonal selection is gaining momentum, and certified clones are establishing a place in the market, the vast majority of vineyards currently in place were planted with mass-selected budwood.

This material was chosen by growers who did not confirm their visual appraisals scientifically. Nor did they give their selections a name. A grower who collected 5,000 scions would take them from any number of vines which he deemed

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suitable. These vines represent an unknown genetic diversity. Thus, in Côte d'Or, Pinot noir does not constitute a group of clearly defined clones bearing specific names. The word 'clone' is often used as if it were the major descriptor for plants. In fact, a clone is simply a group of individuals propagated asexually from a single parent. The whole group shares identical genes. A typical vineyard harbors groups and sub-groups of phenotypes within the vast framework of Pinot noir.

Pinot noir is classified by specific physical characteristics. These traits do not have a direct influence on the wine. They merely constitute signs of a vine's genetic make-up. Beware of an attitude which ignores leaf shape while assuming that only the grape cluster matters. One should avoid attributing too much importance to any single trait. They must all be taken together, though priorities do exist in their degrees of importance. Also, if you use these criteria in examining your own vineyards, beware of falsifying factors such as disease or habitat. Moreover, having a less-than-fine Pinot does not preclude your making a good wine. You might well be able to decrease the vine's shortcomings with your viticultural practices.

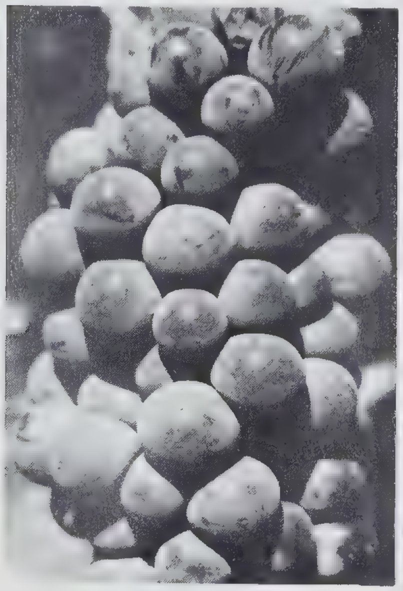
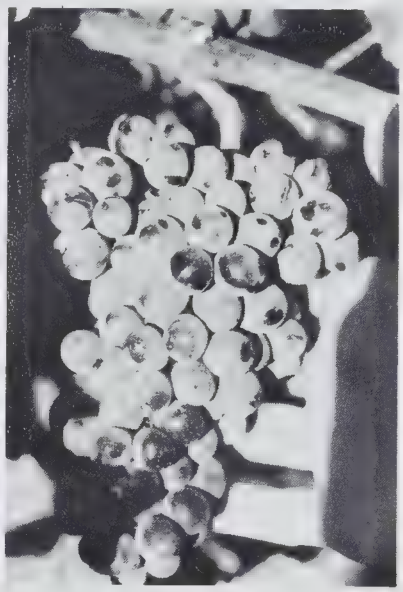


Photo #1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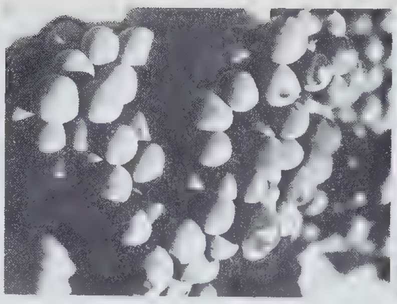
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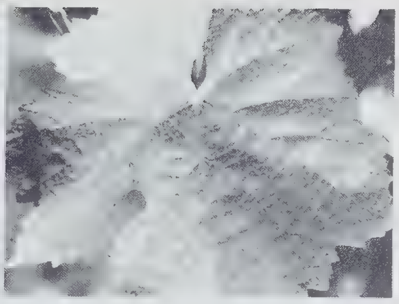
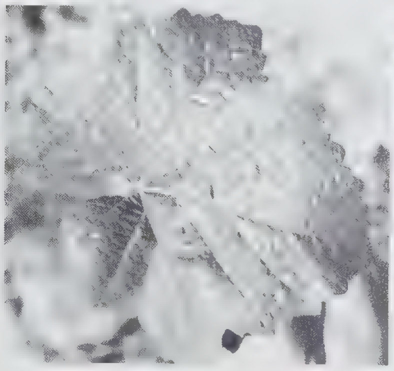


Photo #4

The name 'Pinot' is thought to originate from the French word for pine cone. This would not mean a conical pine cone,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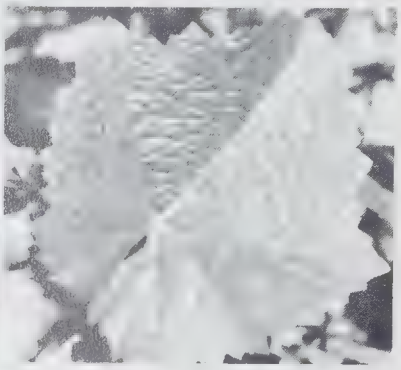
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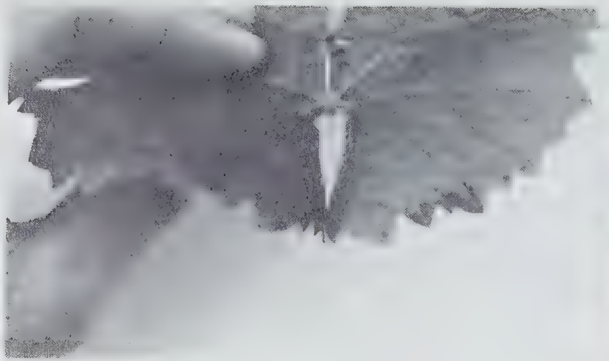
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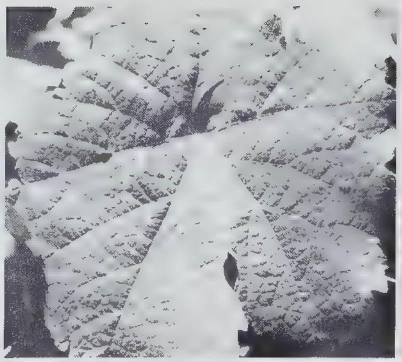
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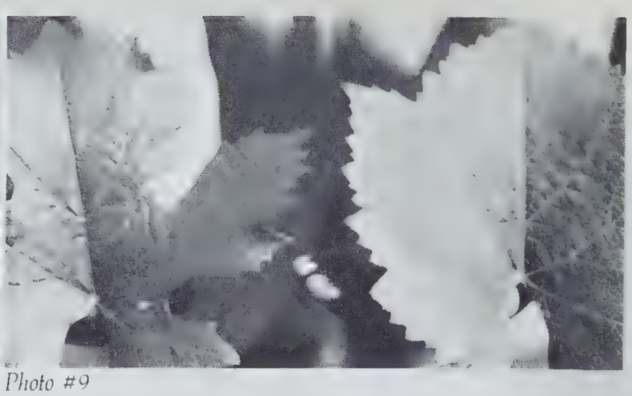
Photo #9

however, because Pinot's most typical trait is its cylindrical cluster. It is normally small and tight (see photo #1). Some Pinots do have a shouldered bunch. Also, one can encounter double bunches where fertility and vigor are high (photos #2, #3).

Pinot noir exhibits a large variation in leaf shape. It often has a lobe on only one side (photo #4). This is not unique to Pinot, but it is particularly common in this variety. Pinot leaves are sometimes asymmetrical to the point of appearing deformed (photo #5). Another trait more common in Pinot than in many other varieties is the involuted blade at the petiole (photo #6). Some Pinots exhibit no sinuses at all, presenting whole, almost round leaves (photo #7). Occasionally a leaf might have a sinus where a lobe should be (photo #8).

In examining leaves, one should avoid suckers, because they are likely to be quite different from the leaves on fruitful canes. Photo #9 shows two leaves from the same vine. The one with the deeper lobes is the sucker, a poor representation of that vine's phenotype.

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Fertility is another trait used in comparing types of Pinot. In Burgundy, it is felt that a vine on which every fruit-bearing cane carries two clusters is on the high side of fertility. Some Pinots are more likely than others to experience a phenomenon called 'millerandage', which involves an uneven 'set' and hence an irregular berry size. This can be detrimental because, under certain conditions, some berries will remain so small as to offer nothing to the winemaker. On the other hand, photo #10 shows the beneficial expression of 'millerandage'. Here the 'millerands' are small yet viable berries which will reach maturity by harvest time. When the cluster is taken as a whole, its high skin-to-juice ratio makes it well-suited to adding color to the batch. A substantial amount of 'millerandage' is often attributed to Burgundy's finest Pinot noir vintages.

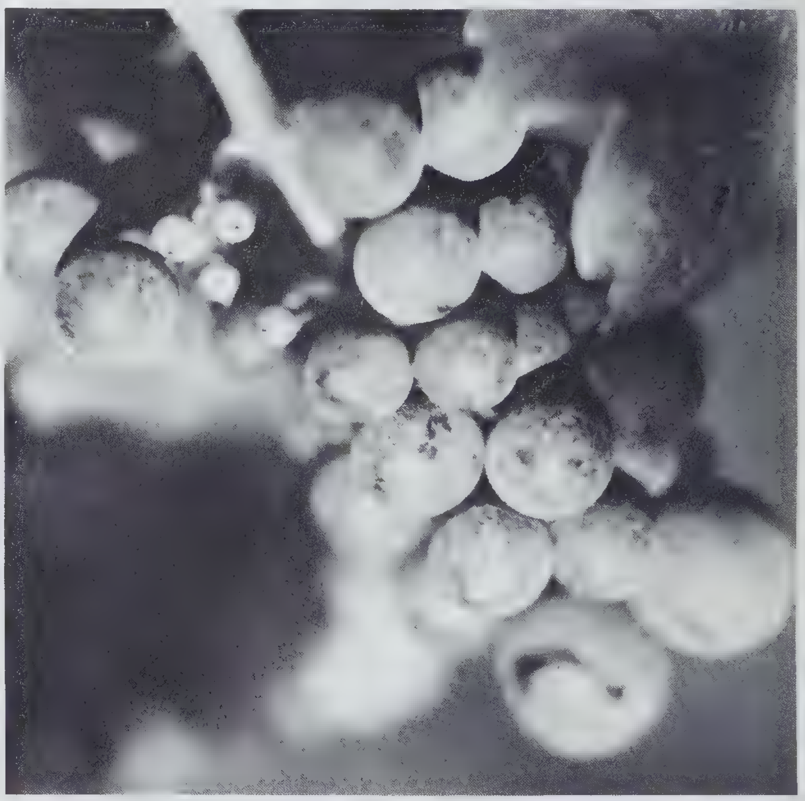
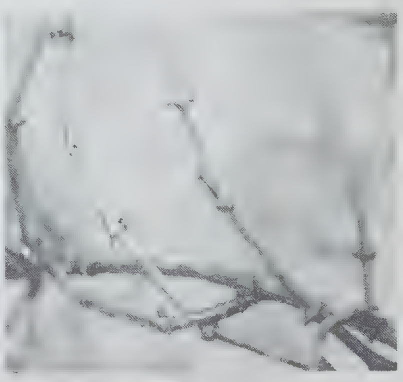


Photo #10

Most strains of Pinot noir send their shoots upward at an angle. The growing canes thus spread out into the lanes on either side of the row. These strains are known as Pinot

Photo #11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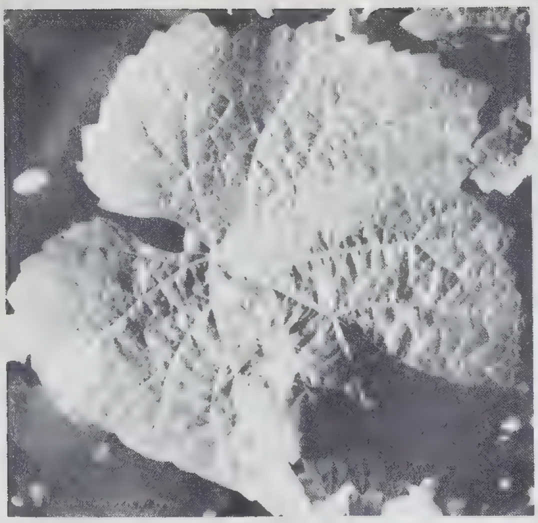


Photo #13

Photo #14

Photo #15

'tordu', or 'bent' Pinot. Pinot 'droit', called 'straight-growing' Pinot or 'erect' Pinot in English, is an exception. Vertical growth is a great help to viticulturists because vines need not be tied up so often. One would seldom have to delay a needed spraying because of canes blocking the tractor's passage. Photo #11 shows a Pinot 'droit'. In photo #12, the canes of Pinot 'tordu' take off horizontally before being tied up.

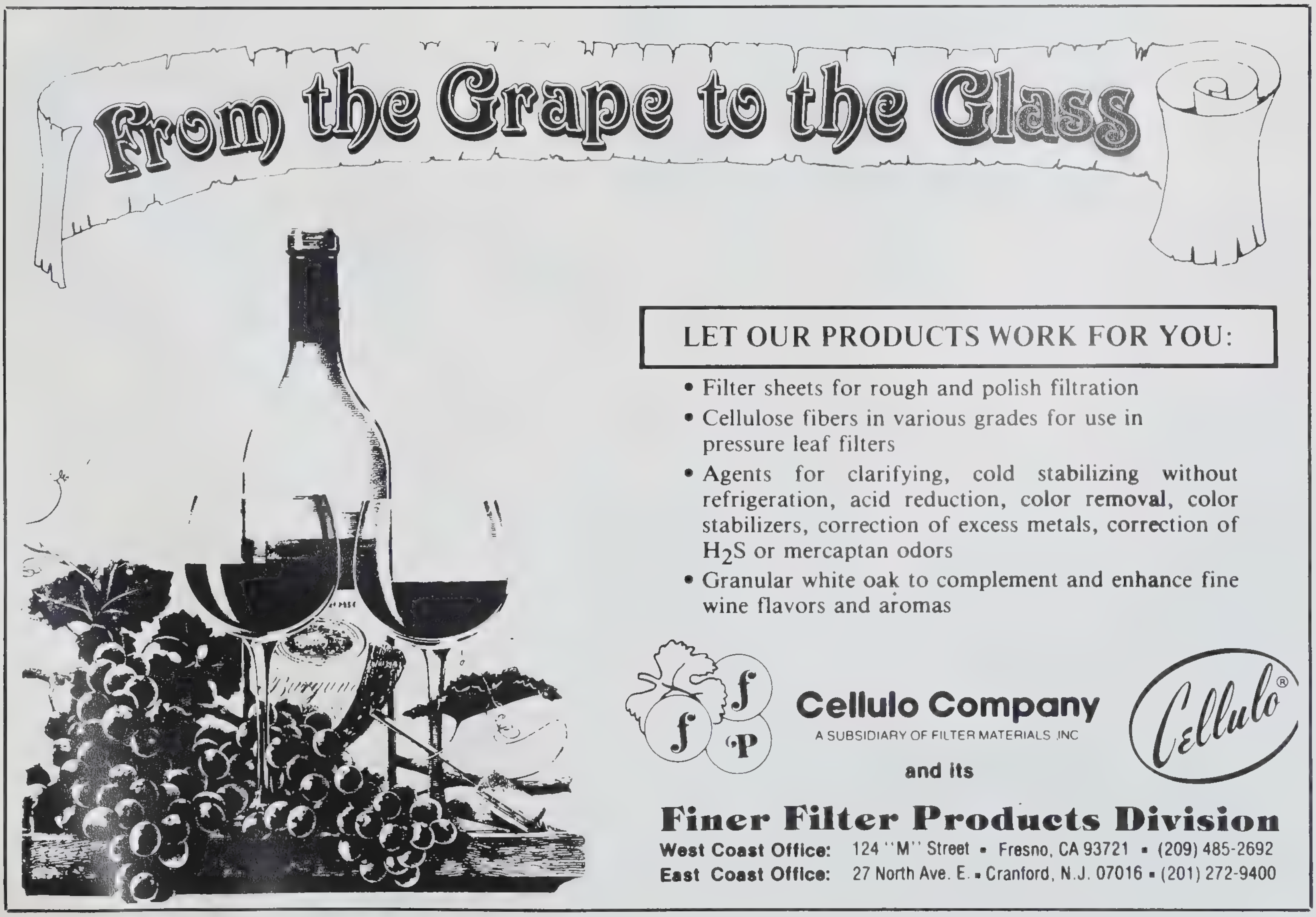
Unfortunately, Pinot 'droit' is not ideal from a winemaker's point of view. It tends to have high vigor and high yield. The erect characteristic appears in some pretty good as well as some not-so-good strains, although none of the particularly good ones. Pinot 'droit' strains thus range from poor to moderate quality.

The traits listed above—cluster shape, leaf shape, fertility, and growth habits—are suitable criteria for describing the predominant strains of Pinot noir.

Burgundy's Three Main Strains of Pinot noir Grown Today

'Gros Pinot' is a 'coarse' Pinot noir. Its leaves tend to have small sinuses, or none at all, and are almost round (photo #13). 'Gros Pinot' overcrops readily, and shows high vigor. It may or may not have erect shoot growth. 'Gros Pinot' is planted by growers who are more concerned with quantity than quality, and can be found even in the highest appellations. The wine it produces is 'dumb' and short-lived.

Pinot 'mi-fin' could be called 'half-fine' or 'demi-fine' Pinot. It tends to have shallow sinuses on one or both sides of the leaf. Less vigorous than 'gros Pinot', it can be kept to moderate yields more easily. Like the 'gros Pinot', it can show both shouldered and double clusters, as well as the cylindrical clusters more typical of Pinot noir. The wine it produces can be good, but is rarely outstanding. In the better vineyards it is generally interplanted with the best strain, not so much



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because of the grower's intention, but rather the imprecision of mass selection. Pinot 'mi-fin' sometimes shows erect growth. Pinot 'droit' can thus be a 'gros Pinot', or a Pinot 'mi-fin', or another Pinot.

Pinot 'fin' could be called 'fine' Pinot. Its clusters tend to be cylindrical. The leaves tend to have deeper sinuses than Pinot 'mi-fin' on one or both sides (photo #14). I should stress that this is not a hard-and-fast rule. When examining a single vine, one encounters a diversity of leaf forms, out of which one must identify the one most typical for that vine. This might not be the most abundant form on the vine.

Photo #15 shows young leaves which were more deeply lobed than the adult leaves on the same vine. They are also more deeply lobed than the average for that vine. I have shown an extreme case intentionally. I also point out that most Pinot 'fin' have some leaves with deep lobes and others with lesser lobes. It is significant that when I saw the vine in photo #15, I thought right away of Pinot 'fin'. This was confirmed by closer examination and by tasting the wine from that vineyard.

Pinot 'fin' is less vigorous than most Pinot strains and therefore usually ripens earlier than other Pinots. Fine Pinot normally produces its best wines in Cote d'Or when its yields are 2-3 tons/acre, or 30-45 hl/ha. Its production is more regular, on the whole, than Pinot 'mi-fin' or 'gros Pinot'. These other Pinots also tend to become exhausted much younger because of their higher yield. They often are torn out after 35-40 years of producing 3-4 tons/acre, whereas Pinot 'fin' can yield 2-3 tons/acre until age 30, and then about 2 tons/acre past age 40 or even 50. The French have found that although a vine is physiologically adult at 8-12 years, it isn't qualitatively adult until past age 25.

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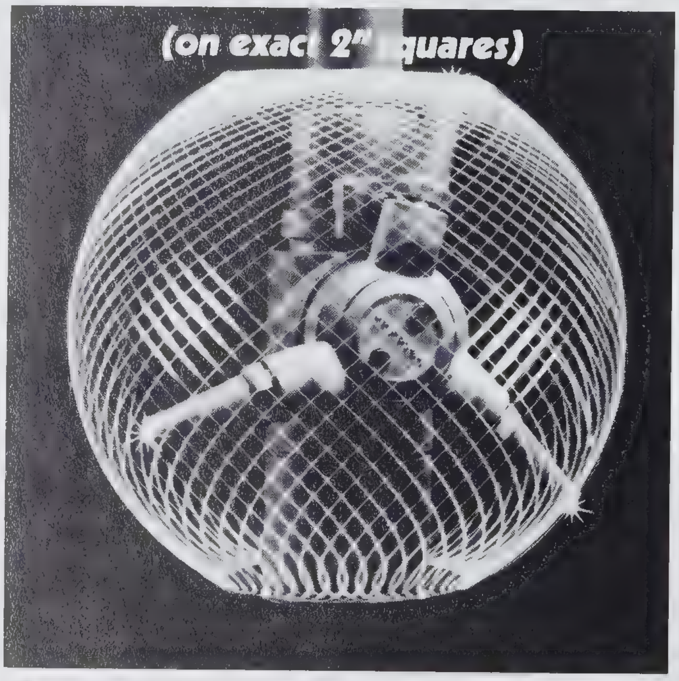

But that's only 1 of 3 major Gamajet advantages!

The unretouched photograph shows that Gamajet's liquid streams clean every portion of tank surface with synchronized 360° precision. What it can't show is their efficient non-feathering jet scouring action at distances of 15, 20, even 25 feet! And it can only hint at the rugged design of a machine built from the highest quality materials to give workhorse performance 16-24 hours a day, 7 days a week.

Then consider Gamajet's ability to use high pressures of 200 psi or more for faster cleaning cycles that save chemicals and waste disposal costs every time. Or, its more powerful jet streams that often permit a tank wash with water alone. Finally, with its complete flexibility (fast, easy, on-site interchangeability of dual or triple washing heads, nozzles and turbines)—it's one machine that will handle any tank cleaning job you'll ever face.

Of course Gamajet quality costs a little more—initially. But not when bottom lines are compared 12 months later with maintenance labor, spare parts and downtime included.

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?

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Proprietary Label Survey

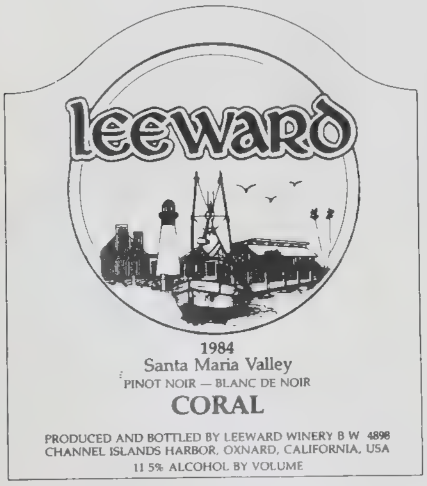
If you use, or are thinking of using, any proprietary labels on your wines, you may find yourself running into unforeseen obstacles. For instance, what if the name you've picked for your wine has already been registered by another winery? How will you identify the contents and character of the wine for the retailer and consumer? What will you tell restaurateurs when they ask what category on their wine list your wine fits into?

These are some of the questions that will be answered in PW's new review on proprietary labeling. The wine style will be described with ranges for alcohol, total acidity and residual sugar allowing for vintage variation. This survey will look at ways in which other wineries are successfully marketing proprietary labels as well as letting you know which names *not* to pick for your wine.

Leeward Winery

Ventura, California

Leeward Winery's proprietary bottling is a blush wine sold along with their vineyard-designated Chardonnays. Winemakers Chuck Brigham and Chuck Gardner wanted a nautical name, and Gardner came up with 'Coral'. Coral makes up 35% of tasting room sales, and is sold in retail outlets and restaurants as well, where it is listed as a blanc de noirs. Production began in 1981 with 500 cases from Edna Valley but since 1982 has used grapes from Santa Maria.


leeward

1984
Santa Maria Valley
PINOT NOIR — BLANC DE NOIR
CORAL
PRODUCED AND BOTTLED BY LEEWARD WINERY B W 4898
CHANNEL ISLANDS HARBOR, OXNARD, CALIFORNIA, USA
11 5% ALCOHOL BY VOLUME

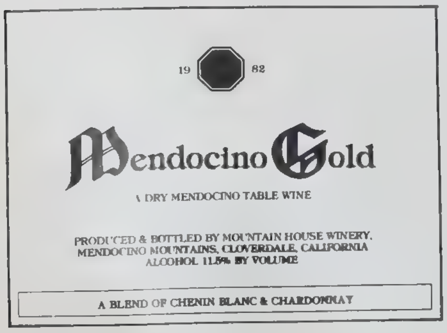
Coral
Alcohol: 11.5%
Total Acidity: 0.80 g/100ml
Residual Sugar: 1.0 g/100ml
Grapes: Pinot noir
Quantity Produced: 1984—2,000 cases
Suggested Retail Price: $5.25

Mountain House Winery

Cloverdale, Mendocino County, California

Mountain House Winery celebrates its home in Mendocino County with a bottling labeled Mendocino Gold. Mendocino Gold was produced in 1981 and 1982, with a 1985 vintage bottling planned.

Mendocino Gold is sold primarily in the winery's tasting room, with about 20% going to retail outlets and restaurants, where it is usually listed under Chenin Blanc. A short label underneath the main label lists wine types used in the blend. Mountain House personnel explain that the wine must be hand-sold as consumers are unwilling to take a chance on a proprietary name.


19 82
Mendocino Gold
A DRY MENDOCINO TABLE WINE
PRODUCED & BOTTLED BY MOUNTAIN HOUSE WINERY,
MENDOCINO MOUNTAINS, CLOVERDALE, CALIFORNIA
ALCOHOL 11.5% BY VOLUME
A BLEND OF CHENIN BLANC & CHARDONNAY

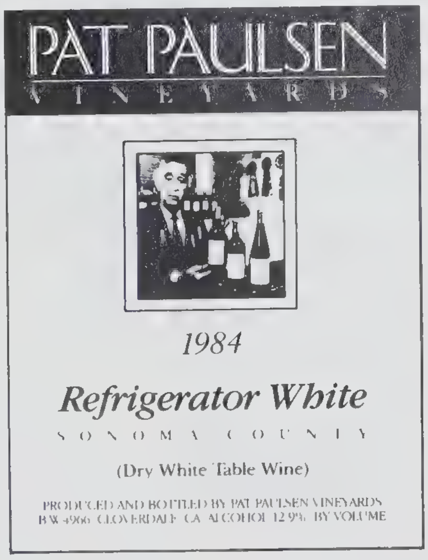
Mendocino Gold
Alcohol: 12.5%
Total Acidity: 0.69 g/100ml
Residual Sugar: dry
Grapes: Chenin blanc, Chardonnay (1981 included French Colombard)
Quantity Produced: 450 cases
Suggested Retail Price: $5.50

Pat Paulsen Vineyards

Cloverdale, Mendocino County, California

1984 was the first vintage for Refrigerator White, produced by Pat Paulsen Vineyards. The name was submitted by winemaker Jamie Meves in a contest among winery principals to pick a name for the wine. Paulsen's varietal bottlings include Cabernet Sauvignon, Chardonnay, Muscat Cannelli, and Sauvignon Blanc.

Refrigerator White is available both in retail outlets and in restaurants. The percentage of each varietal is included in humorous side panel text by comedian and erstwhile presidential candidate Paulsen.


PAT PAULSEN
VINEYARDS
1984
Refrigerator White
SONOMA COUNTY
(Dry White Table Wine)
PRODUCED AND BOTTLED BY PAT PAULSEN VINEYARDS
BW 4966 CLOVERDALE CA ALCOHOL 12.9% BY VOLUME

Refrigerator White
Alcohol: 12.9%
Total Acidity: 0.69 g/100ml
Residual Sugar: 0.50 g/100ml
Grapes: Gewurztraminer, Sauvignon blanc, Chardonnay
Quantity produced: 1984–2,463 cases; 1985 projection: 6,000 cases
Suggested Retail Price: $6.50 /1.5L

Trefethen Vineyards

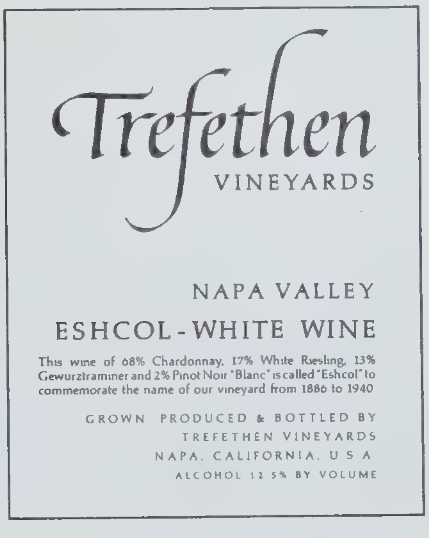
Napa, California

Eshcol Red and Eshcol White are the names for Trefethen's 100% estate red and white table wines, which have been released annually since 1978. Eshcol was the original name of the estate vineyard and winery from 1886 to 1940. Trefethen also sells Cabernet Sauvignon, Chardonnay, Pinot Noir and White Riesling under varietal labels. Eshcol bottlings usually total 1/3 of Trefethen's annual releases.

Eshcol wines are sold in both retail outlets and restaurants, where they are usually poured as house wines. Other than a listing of varietal percentages on the front labels, no descriptors are used for these wines. Despite this, questions regarding the wines' contents are frequently asked. Marketing frustrations with the name Eshcol occur due to misspelling and mispronunciation. Trefethen is also battling the public's perception of table wines as sweet wines by keeping acid levels up and residual sugar low.

Eshcol Red Wine
Alcohol: 12.0 - 13.5%
Total Acidity: 0.46-0.58 g/100ml
Residual Sugar: 0.08-0.13 g/100ml
Grapes: Cabernet Sauvignon, Pinot noir, Zinfandel, Merlot
Suggested Retail Price: $4.25

Eshcol White Wine
Alcohol: 12.0-13.5%
Total Acidity: 0.65-0.88 g/100ml
Residual Sugar: 0.25-0.70 g/100ml
Grapes: Chardonnay, White Riesling, Gewurztraminer, Pinot noir (free run juice)
Suggested Retail Price: $5.50


Trefethen
VINEYARDS
NAPA VALLEY
ESHCOL-WHITE WINE
This wine of 68% Chardonnay, 17% White Riesling, 13% Gewurztraminer and 2% Pinot Noir "Blanc" is called "Eshcol" to commemorate the name of our vineyard from 1886 to 1940
GROWN PRODUCED & BOTTLED BY
TREFETHEN VINEYARDS
NAPA, CALIFORNIA, U S A
ALCOHOL 12 5% BY VOLUME

Services of Vendors

Agri-Fab Industries/Vineyard Supplies, PO Box 536, Lodi, CA 95241 (209) 334-3560. *B4, V2*

Ahlstrom Machinery Inc., PO Box 74, Glen Falls, NY 12801 (518) 798-9541. *P3, W3*

Ashbrook-Simon-Hartley, PO Box 16327, Houston, TX 77222 (713) 449-0322. *P1*

Barrel Builders, 1085 Lodi Lane, St. Helena, CA 94574 (707) 963-7914. *B2, B3, B6*

A. Bellagio Wood Tank Co., Inc., 12786 Old Redwood Hwy, Healdsburg, CA 95448 (707) 433-4605. *Wood Tanks*

Blake Printery, 2222 Beebee St., San Luis Obispo, CA 93401 (805) 543-6843. *L3*

Boswell Company, 305 San Anselmo Ave #313, San Anselmo, CA 94960 (415) 457-3955. *B2, B3*

Calpac Container Co., 33359 Central Ave., Union City, CA 94587 (415) 471-5091. *B8*

Cellulo Co., Finer Filter Products Div., 124 M St., Fresno, CA 93721 (209) 485-2692; Cranford, NJ (201) 272-9400. *D2, E2, F2, F3, F5, L1, T2, Y1*

Chateau Bottlers, PO Box 2274, Napa, CA 94558 (707) 253-1254; 26 Woodland Ave., San Rafael, CA 94901 (415) 454-2355. *M2*

Cherokee Tank Lines, 5463 Cherokee Rd, Stockton, CA 95205 (209) 931-3573. *T5*

Cherry-Burrell Corp., 2400 6th St.SW, Cedar Rapids, IA 52406 (800) 553-8867. *F6, P3, T1, V1*

Joseph W. Ciatti Co., Inc., 42 Miller Ave., Mill Valley, CA 94941 (415) 388-8301. *B12*

The Compleat Winemaker, 1219 Main St., St. Helena, CA 94574 (707) 963-9681. *B10, C2, C8, D1, F2, F6, H2, L4, L6, P1, P3, S1, S3, S4, T2, T4, V1*

Criveller Co., 6863 Lundy's Lane, Niagara Falls, ON., L2G 1V7 (416)357-2930; PO Box 162, Lewiston, NY 14092. *B10, E2, F2, F3, P3, Y1*

Custom Cooperage, 1194 Maple Lane, Calistoga, CA 94515 (707) 942-6902. *B2, B3, B6*

Data Consulting Associates, Inc., 18000 Coleman Valley Rd, Occidental, CA 95465 (707) 874-3067. *C5*

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Eagle-Picher Industries, Inc., 580 Walnut St., Cincinnati, OH 45202 (513) 721-7010. *D2*

ENCORE!, 860 So. 19th St., Richmond, CA 94804 (415) 234-5670. B8, B11

Enotech Corp., PO Box 576, Palo Alto, CA 94302 (415) 858-1090. *C8, S2*

ETS (Enological Technical Service), 1204 Church St., St. Helena, CA 94574 (707) 963-4806. L5, M1, Y1

Fischer & Schug Winery Equipment, 940 Dowdell Lane, PO Box 556, St. Helena, CA 94574 (707) 963-3169. *B9, B10, B11, C1, C6, C7, C10, D1, F2, F6, H2, L2, L4, L6, P1, P2, P3, T3, T4, U1, V1*

fp Packaging, Inc., 229 Ryan Way, S.San Francisco, CA 94080 (415) 871-5497. B10, C8, C10, D1, F2, L3, L4, P1, S2

Genencor, Inc., 180 Kimball Way, S.San Francisco, CA 94080 (415) 588-3475. E2

Grefco Minerals, 3435 W. Lomita Blvd., Torrance, CA 90509 (213) 517-0700. *D2*

Groskopf Warehouse, PO Box 128, Vineburg, CA 95487 (800) 221-0229 in California; (707) 996-2113 for other areas. *W1*

International Closures & Supplies, San Leandro, CA 94577 (415) 483-3750. *C8, S2*

IRAPP, 195 Dry Creek Rd., Healdsburg, CA 95448 (707) 433-9471. *R1, T3*

ITT Jabsco Corp., 1485 Dale Way, Costa Mesa, CA 92626 (714) 545-8251. *P3*

Jasper Wood Treating, PO Box 11498, Eugene, OR 97440 (503) 342-2300 (out-of-Oregon: 800-547-6063). *T6*

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Mel Knox/Stone, 1229 Third Ave., San Francisco, CA 94122 (415) 661-3413, (415) 661-1616. *B2, B8, B9, B10, L4*

LaFitte Cork & Capsule,Inc., 1180 Hamilton Ct., Menlo Park, CA 94025 (415) 322-1838. *C8, S2*

Mack-Wayne Closures, PO Box 405, Wayne, NJ 07470 (201) 696-1212; 285 Sutton Pl., Santa Rosa, CA 95401 (707) 584-9711. *C9, S2*

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Miles Laboratories, Inc., Biotech Products Div., PO Box 932, Elkhart, IN 46515 (800) 348-7414. *E2*

Millipore Corp., Bedford, MA 01730 (800) 225-1380. *F2*

Moffett Co. Inc., 6985 Via Del Oro A-5, San Jose, CA 95119 (408) 578-4910. *B2, B9, C8, B10, F2, F3, H1, L6, P1, S2, S4, Y1*

Monitor Manufacturing, PO Drawer AL, Elburn, IL 60119 (312) 365-9403. *T3*

Napa Grape & Equipment Co., 948 Third St., Napa, CA 94559 (707) 252-9555. *B10, C9, D1, F2, F3, H2, L2, P1, P3, S4, W2*

Otto Sick, Corp., PO Box 1101, Palo Alto, CA 94302 (415) 858-1090. *B10*

Pickering Winery Supply, 1300-22nd St., San Francisco, CA 94107 (415) 821-2400. *C2, C3, C4, C5, F2, T2*

Pneumatic Scale Corp., 65 Newport Ave., Quincy, MA 02171 (617) 328-6100. *B10*

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WESTEC, 195 Dry Creek Rd., Healdsburg, CA 95448 (707) 433-8829. *F6, P3, W3*

Brian R. White Co.,Inc., 313 Henry Station Rd., Ukiah, CA 95482 (707) 462-9795. *I3, S1, V2*

Wilden Pump & Engineering Co., 22069 Van Buren St., Colton, CA 92324 (714) 783-0621. *P3*

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Winery Equipment Systems, PO Box 3361, Napa, CA 94558 (707) 257-1103. *P3, W3*

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Vol.I:3 SO_2 via Ripper Method & Platinum Electrode • Tartrate Stability

Vol.I:4 McDowell Valley Vineyards(CA) • Enzymatic Wine Analysis • Acid Reduction

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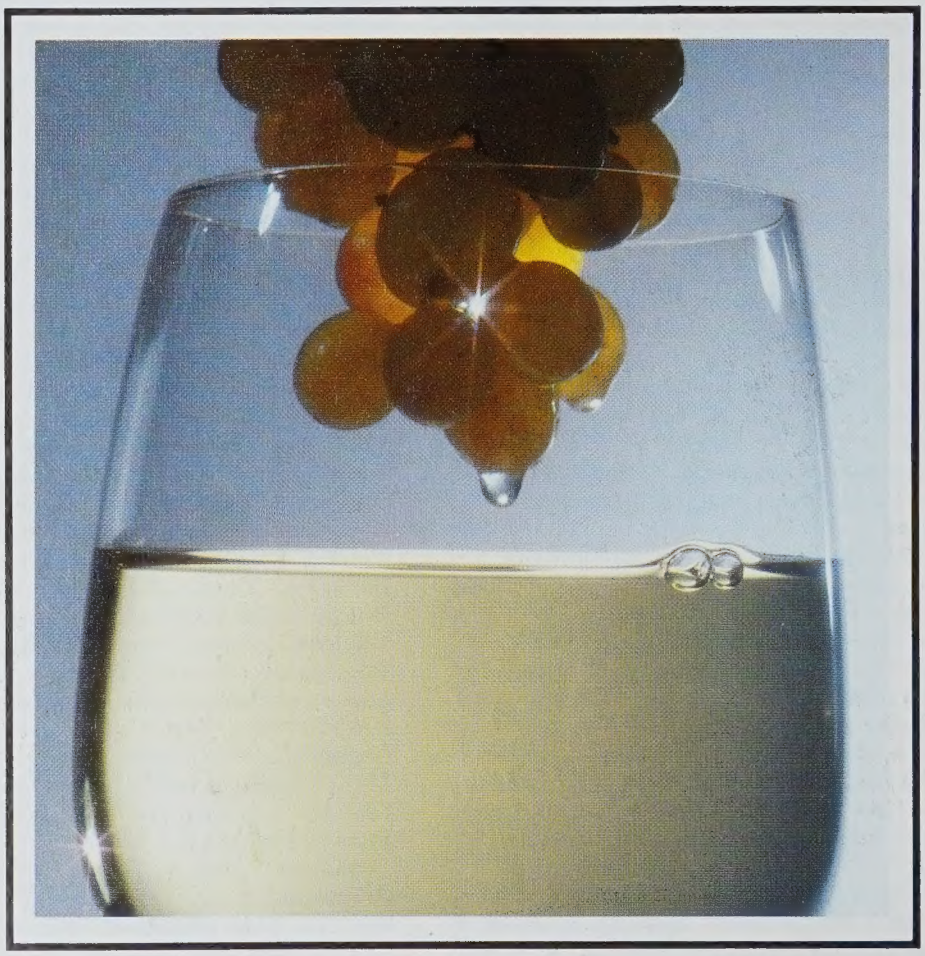

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